TRANSPORTATION DEMAND MANAGEMENT

DEVELOPMENT OF A REGIONAL TRANSPORTATION PLAN FOR THE GREATER TORONTO and HAMILTON AREA

FOR CONSULTATION

GREEN PAPER #4

FEBRUARY 2008

metrolinx

LINKING PEOPLE TO PLACES • ON Y VA

A Message From the Chair

February, 2008

Rob MacIsaac
Chair, Metrolinx

Better transportation choices. That is the fundamental principle behind the Regional Transportation Plan (RTP) that Metrolinx is developing.

We want to give people better choices when it comes to their transportation decisions. In large part, that will happen by improving the transportation supply — the types, numbers and sizes of options available.

But changing the supply of transportation choices is only part of the equation. We also need to change the way people use the system. In other words, it is not just about *having* better choices, it is also about *making* better choices.

Optimizing use of the transportation system so that it functions efficiently is what Transportation Demand Management (TDM) is all about. It is the subject of the fourth in our series of Green Papers feeding into the RTP process.

In many ways, our attitude is what matters most. For generations, our thinking about transportation has been centred on the automobile. The RTP gives us the perfect opportunity to encourage new patterns that will create the convenient, sustainable transportation system we all desire.

Fortunately, technology has created opportunities never before available in transportation. The Internet creates extraordinary possibilities for transportation management that could not have been imagined even 10 years ago. User information, such as route planners, bus and train timetables, online ticket purchasing and ride-sharing opportunities, to name just a few ideas, can all contribute to a more efficient, less congested transportation system.

As with the other Green Papers, we want to hear from as many people as possible about what they think will or will not work as we consider options for managing transportation demand.

We want to know how we can better educate people on their transportation decisions. We want to know what incentives, or disincentives, might get more people to change their travelling habits. We are looking for ideas on whether and how to implement user pricing.

The more input we get, the better we will be able to determine what approach to take, not just for TDM, but for every component of the RTP.

Ultimately, our goal is to do a better job of planning and funding infrastructure decisions, to make sure the transportation system is coordinated, seamless and sustainable across the region.

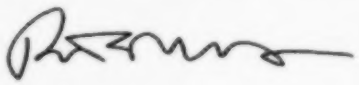
This is a tremendous opportunity, with tremendous potential benefits:

- We can make this a more liveable region by improving people's mobility and giving them more personal time;
- We can position our economy as a strong competitor on the world stage by making sure that businesses get their supplies and their products to market with ease; and
- We can protect and enhance our environment by reducing greenhouse gas emissions and reducing the impact of pollution on our air, water and land.

Achieving these benefits will not be easy. It is going to take leadership, planning, cooperation and determination. Most of all, it is going to take thoughtful consideration, based on realistic, pragmatic information.

That is why we need your input — to make sure our vision for this region's transportation system, including Transportation Demand Management, will meet your needs.

Thank you for taking the time to read and comment on this Green Paper. We look forward to receiving your views.



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Executive Summary

Transportation Demand Management (TDM) is a relatively new concept, but it can play a vital role in how we shape our transportation system in the future.

For generations, most transportation planning decisions focused almost exclusively on supply — building more roads, expanding subway lines, and designing larger buses. In recent years, more attention has been paid to the demand side of the equation, to consider that the way people are using the system has a significant impact on its capacity and efficiency.

Transportation Demand Management will be a component of the Regional Transportation Plan (RTP) now being developed by Metrolinx. This Green Paper sets out the benefits, challenges, pros and cons, and potential opportunities for TDM to help improve the transportation system across the Greater Toronto and Hamilton Area (GTHA).

WHAT IS TRANSPORTATION DEMAND MANAGEMENT?

Transportation Demand Management is the use of policies, programs, services and products to influence *whether, why, when, where* and *how* people travel. Its goal is to make personal travel decisions more sustainable and to make more efficient use of our existing transportation system.

Potential TDM initiatives range from expanded school and employer incentive programs to regulatory and pricing measures that encourage people to use the transportation system efficiently.

Transportation Demand Management has two general approaches:

- **Education, promotion and outreach** – raising individuals' awareness, improving their understanding and building positive attitudes about sustainable transportation choices; and
- **Incentives and disincentives** – offering tangible benefits or obstacles related to personal travel choices and making certain choices more or less attractive on a practical level.

CURRENT TDM APPLICATIONS

Transportation Demand Management tools and policies that have been tested in the GTHA include regional initiatives like *Smart Commute* and employer-specific programs in both the private and public sectors.

Smart Commute supports a network of transportation management associations, offering customized local services including carpooling programs, cycling programs, vanpool assistance, shuttles and Emergency Ride Home (ERH, a kind of "commuter insurance") programs, employee work arrangement solutions (including telework, flexible work hours and compressed work weeks), site assessment, and surveys and promotions (such as the "Commuter Challenge").

Other examples of existing TDM tools or initiatives include:

- Online trip planners for transit agencies (e.g. Mississauga Transit, Hamilton Street Railway, Brampton Transit, York Region Transit) that permit users to enter their travel time, origin and destination and have the website display the best transit route;
- TDM programs at several colleges and universities that usually include universal transit pass (U-PASS) programs;
- The COMPASS website that provides traffic flow maps to illustrate areas of severe congestion, helping users to select trip times or routes that minimize delay;
- Electronic tolling on Highway 407 that varies by time of day and vehicle type;
- The Presto Smart Card project that provides a single card for fare payment across regional transit services;
- Active and Safe Routes to School programs that encourage children to walk and bicycle to school;
- High Occupancy Vehicle (HOV) lanes that encourage carpooling;
- City of Toronto cycling promotion and CAN-BIKE education efforts;
- City of Toronto's requirement for a TDM plan within development applications;

- Bulk transit pass sales by Toronto Transit Commission (TTC) and York Region Transit; and
- Transit pass sales for certain groups — for example, discounted transit fares provided for riders connecting to GO Transit.

To date, the overall impact of TDM in the GTHA has been relatively small. However, the rapid pace of growth implies that continued efforts could have much more significant impacts in the foreseeable future.

STRATEGIC ISSUES

The RTP must address a number of strategic TDM issues. Incentives and disincentives — and additional "carrots and sticks" — will require careful consideration.

Some of the key issues are as follows:

- **Transportation Pricing**

Efficient and sustainable decisions by transportation system users require an awareness of and sensitivity to the actual costs of transportation facilities and services. Without a clear and effective pricing regime, user decisions will not reflect the full costs of transportation, including its direct capital and operating costs, as well as its external impacts such as those on human health and the environment.

User pricing can help motivate the decisions of individual travellers to favour more sustainable travel modes (e.g. walking, cycling or transit) that use less energy and reduce emissions. Revenues generated could be used to make those choices even more attractive.

Examples of pricing tools include: distance-based vehicle registration fees; distance-based insurance premiums; fuel taxes; emission charges; parking fees; and highway tolls.

Road pricing initiatives must be carefully planned to ensure social equity and the existence of attractive transportation services to accommodate those who choose to change modes.

- **Land Use and Parking Management**

Currently, large surface parking lots are a mainstay of our urban landscape. With the exception of downtown Toronto, pedestrian-oriented commercial venues and other high-demand areas such as hospitals, parking is normally "free". Because of this, there is little incentive for an individual to carpool or use other sustainable modes of transportation.

A multi-faceted approach is required to encourage parking management approaches that support TDM and more transit-supportive development. For example, employer parking lots and Park-and-Ride lots at transit stations could provide multiple-occupant vehicles with favoured parking locations in the lot and possibly reduced rates. Strong disincentives may also be necessary, such as maximum parking limits, to break the cycle of parking and automobile dependency.

- **The Role of Technology**

Technology, as it applies to TDM, can provide greater information, added flexibility and system integration for users through initiatives like traveller information, trip planning, electronic payment and smart card technology.

Smart cards, such as the recently-launched Presto Card, and electronic payment, for example, can dramatically improve customer convenience.

Traveller information and trip planning are other examples of technological advancements which contribute to an improved transportation experience. Traveller information systems, such as electronic highway signs which provide real-time information relating to current conditions, help users optimize travel decisions and ease stress while on the road or while taking transit. Trip planning offers users tools that can be accessed at home, at work or en-route, to plan out trips in advance.

Some additional initiatives that would improve traveller information and trip planning include:

- Expanded information on transit vehicles and terminals through electronic displays and automated stop announcements;
- Regional 511 Traveller Information Services telephone hotline, providing local transportation information by telephone; and
- Messages to mobile devices, providing real-time information linked to the future Metrolinx trip planning system.

MOVING FORWARD

Metrolinx has recently committed to a number of Quick Win projects, including two that represent excellent elements of an integrated regional TDM strategy:

- **Web-based trip planner** – A seamless scheduling and mapping system for inter-regional transit customers, with real-time travel delay and incident advisories. The system would be developed in collaboration with transit service providers.
- **Personal carbon footprint calculator** – A web-based system to increase awareness of the impacts of personal travel and employment/home location decisions on air quality, climate change, biodiversity and other environmental indicators.

Moving forward, Metrolinx's vision for TDM is to establish effective and efficient programs and strategies that will motivate more sustainable transportation decisions by people, businesses and governments.

Transportation Demand Management will have a fundamental role in making the best use of existing facilities and maximizing the return on future investments in public transit, active transportation, roads and goods movement. It will help ensure that the transportation system across the GTHA is being used as efficiently as possible. Through targeted actions and programs, we can become a TDM leader in North America.

WE WANT YOUR INPUT...

To participate in the Regional Transportation Plan consultations, please visit our website at:

www.metrolinx.com

You can also get in touch with us by fax, e-mail or regular mail:

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1 Introduction

1.1 The Need to Manage Transportation Demand

Traditionally, improving mobility has been viewed as a transportation supply problem. Conventional wisdom says that if roads are congested, they must have inadequate capacity; if few people are using transit, buses must be too slow or infrequent. However, this is a narrow perspective that ignores important aspects of the broader picture. How well we use the system is just as important as the system itself. An unrelenting focus on expanding the system is simply not sustainable.

Transportation projects are expensive — they consume precious land and resources, they take years to put in place, and they often encourage even greater demand. New roads can create more problems than they solve. Indeed, the very notion that we can "build our way out of congestion" is now antiquated. We need to create greener, more efficient and balanced transportation systems by shifting our focus to changing behaviours — that is, we need to shape demand to make the best use of the infrastructure we already have.

There are many opportunities in which to do this. Most cars on our streets and highways have only one occupant and if even a small number of solo drivers started to carpool, the slight drop in traffic could lead to much larger reductions in congestion and emissions. Programs that help people carpool are one aspect of Transportation Demand Management (TDM), along with efforts to spread peak travel and encourage transit use, cycling, walking and telework.

Transportation Demand Management is the use of policies, programs, services and products to influence *whether, why, when, where* and *how* people travel. Its goal is to make personal travel decisions more sustainable and to make more efficient use of our existing transportation system.

TDM influences WHETHER, WHY, WHEN, WHERE and HOW people travel

1.2 The Regional Transportation Plan

Metrolinx was created by the Government of Ontario to plan and deliver improved and comprehensive transportation for the Greater Toronto and Hamilton Area (GTHA). An immediate priority for Metrolinx is the creation of a Regional Transportation Plan (RTP) — a strategic, long-term vision for a coordinated transportation system across the entire region. The RTP will serve as a guideline for infrastructure investment decisions and a blueprint for action.

Development of the RTP includes a series of seven Green Papers as the basis of consultation on key topics including: sustainable transportation; mobility hubs; active transportation; transport demand management; moving goods and delivering services; roads and highways; and transit. These Green Papers will be followed by White Papers, then by a draft RTP. These documents will be posted on the Metrolinx website and the *Environmental Bill of Rights* Registry for interactive input from the public and stakeholders. Results from consultation with the public, stakeholders, advisory groups, Metrolinx staff and the Metrolinx Board of Directors will feed directly into the plan.

The draft RTP will emphasize balanced initiatives that ensure access by all residents and visitors to a full range of transportation choices across the metropolitan region. It will also provide a framework for transportation decisions at the local level by citizens, system users, transportation service providers and other stakeholders.

1.3 About This Paper

Metrolinx is committed to developing an RTP that facilitates more efficient and sustainable travel behaviours. This is a bold objective, particularly given that the trend has been towards fewer people per car, more frequent trips and a long-term decline in per capita transit use.

However, future policy should not be dictated by past trends. In fact, in this case, it should aim to reverse them. Overcoming our transportation challenges will require a combination of progressive land use planning, strategic investment in transit, walking and cycling facilities, and an ambitious approach to managing transportation demand. In order to make the most efficient use of our transportation system, strong connections must be made between all modes and facets of the system.

This paper presents a case for a new forward-thinking TDM strategy in the GTHA that enhances all components of the RTP. It presents a range of moderate to bold TDM actions that should be integrated with infrastructure investments to maximize the use of sustainable transportation options. Motivating people to rethink *whether, why, when, where* and *how* they travel is essential to successfully managing growth in the GTHA and cannot be achieved solely through infrastructure.

This paper begins with a description of TDM and identifies two major types of TDM measures: education; promotion and outreach; and incentives and disincentives. It also offers a discussion of the benefits of greatly increasing the role of TDM in regional transportation planning. A sampling of innovative practices from around the world is presented with the intention of helping readers imagine what might be achievable in the GTHA.

The past and present applications of TDM in the GTHA are described to highlight innovations and success stories. Strategic issues that may hinder or complement the implementation of a TDM strategy in the GTHA are discussed. A vision is proposed, focusing on overcoming barriers that arise from land use, low transit investment, and social and economic trends, pointing the way to the GTHA becoming a North American leader in TDM.

In order to help generate discussion on this topic, "Incremental Change" and "Bold" approaches to TDM implementation are presented to reflect a range of potential visions for the future. Potential initiatives range from expanded school and employer incentive programs to regulatory and pricing measures that could reallocate scarce resources (e.g. road and parking space) and encourage people to use the transportation system efficiently.

In reviewing the paper, readers are encouraged to stretch their imaginations and to consider the question, "What would it take to make my travel choices more sustainable?"

1.4 The Role of TDM in the RTP

As part of the RTP, a regional TDM strategy offers great potential. While some strides have been made, TDM at this point is a largely untapped resource in the GTHA. Regional coordination is only a recent phenomenon, and the resources devoted to implementation have paled in comparison to progressive cities in North America and around the world. Transportation Demand Management offers the potential for a large return on investment when combined with other RTP elements.

Building from the sustainable principles of the province's *Growth Plan* to shape and accommodate future growth, the RTP will be developed based on the needs of people, the environment and the economy. How does TDM contribute to improved mobility when viewed through each of these lenses?

Transportation Demand Management encourages more efficient use of the transportation system by reducing travel peaks and making sustainable modes like transit, carpooling, walking and cycling more attractive. It can benefit people, the environment and the economy in many ways.
People
• Improved access and mobility for people of all ages and means, including those without access to a car • Greater transportation choice • Healthier lifestyles and reduced risk of obesity, diabetes, asthma and other chronic illnesses • Reduced stress levels • Vibrant, walkable communities that re well-linked and provide strong social ties and sense of place • More time for recreation and relaxation by reducing peak period congestion • Taxpayer relief as transportation costs are shifted to users
The Environment
• Lower consumption of, and reliance on, fossil fuels • Lower emissions of greenhouse gases that cause climate change • Lower emissions of air pollutants that cause smog • Less degradation of water resources due to runoff from vehicles and roads • Less neighbourhood disruption caused by traffic • Reduced consumption of land for roads and parking
The Economy
• Lower-cost and more affordable transportation options • More reliable travel time and reduced congestion costs borne by individuals and businesses • Greater return on investment in infrastructure • Reduction or deferral of road capital and operating costs • Reduction in parking costs for businesses and institutions • Enhanced adaptability to energy supply risks • Healthier workforce and lower healthcare costs; reduced occurrence of traffic incidents • Enhanced prosperity by helping businesses attract and retain investment and skilled labour • Support for technological innovation

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2 Overview of Transportation Demand Management

2.1 Encouraging Sustainable Travel Choices

After a hurried breakfast, you drive the kids to school as your partner takes the other car to work. After dropping off the kids you begin a one-hour commute, driving alone in stop-and-go traffic. Statistically speaking, however, you are anything but alone. In the GTHA, just one in six cars carries a passenger, [1] and this number continues to decline. In this scenario, what would have to change for your daily routine to be more efficient? Are there some simple incentives or disincentives that would motivate you to have your child walk to school so you could carpool with your partner? What about working from home, or even moving your home closer to your workplace? Or, is it simply a matter of being better informed about the transportation options that are already available to you?

The essence of TDM is to help people make more sustainable travel choices — that is, choices that reduce costs, energy use, emissions and health impacts while maximizing social and economic benefits.

Small successes, like an individual's decision to take transit or carpool rather than drive on one day each week, may seem insignificant when looking at the overall picture. However, small individual decisions multiplied over a region of six million residents can make a huge difference.

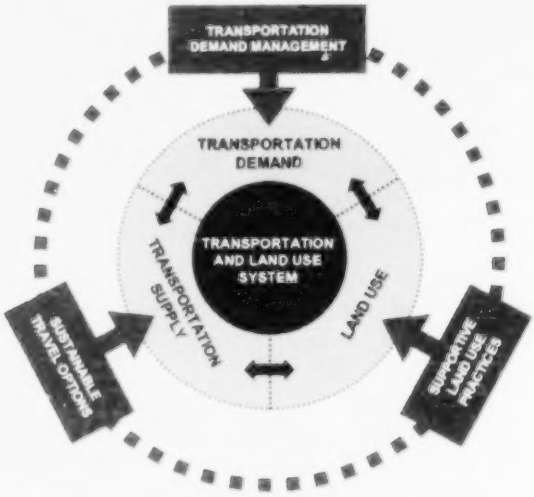

Figure 1 : Transportation and land use inputs.

If every commuter in the GTHA decided to leave his or her car at home just one day a week, this could result in a 20 per cent reduction in commuting traffic, saving millions in healthcare costs and reducing the impacts of traffic congestion. This may seem like a lofty goal, but there are many policies and practices available to help us start changing our transportation perspectives and decisions.

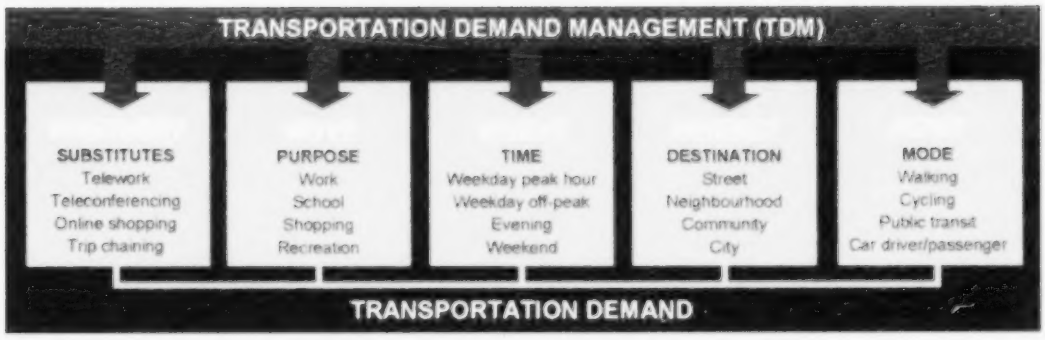

Figure 2 : Major components of TDM programs.

1 Based on 2006 Cordon Counts for GTA Regions, Data Management Group.

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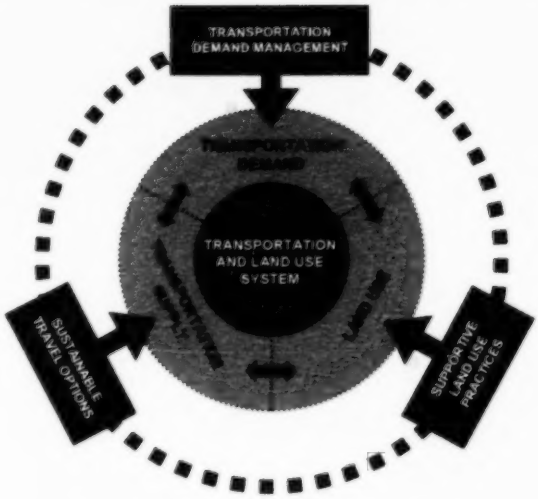

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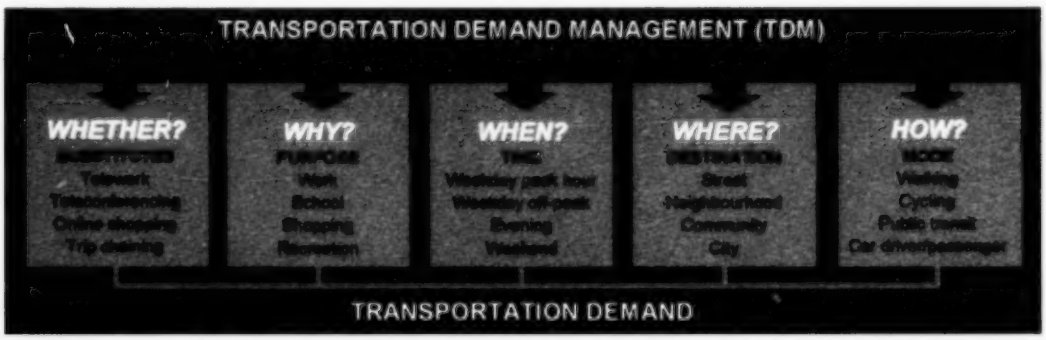

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2.2 TDM Measures

Transportation Demand Management is the use of policies, programs, services and products to influence *whether, why, when, where* and *how* people travel. [2] It is an integral part of any sustainable mobility system. Broadly speaking, TDM works in two ways:

- **Through education, promotion and outreach** to raise individuals' awareness, improve their understanding, build positive attitudes about sustainable transportation choices, and provide tools to gain better access to available options; and
- **Through incentives and disincentives** to offer tangible benefits or obstacles related to personal travel choices and make certain choices more or less attractive.

Transportation Demand Management measures shape the *social* and *economic* factors behind personal travel decisions by, for example, providing information or assistance, influencing social views and expectations and adjusting the prices of various services. While TDM measures do not often shape the substantive physical factors which affect personal travel decisions (e.g. land use planning, design of bike lanes or location of transit infrastructure), there are cases in which TDM can affect physical factors such as the strategic provision of carpool lots, on-site bike parking/change room facilities, placement and availability of car-sharing, preferential parking for carpoolers, greening of school parking lots and the provision of telework facilities/satellite office spaces.

The following table shows how, in practice, TDM initiatives can be grouped according to the market they target:

2 This section is based on The Case for TDM in Canada (draft), Noxon Associates Limited and Commuting Solutions, Association for Commuter Transportation of Canada, 2007

Initiative Types and Target Markets	Example Measures
Workplace • Commuters	• Subsidized transit passes • Tax exemption for transit benefits • Ride-matching services • Vanpool promotion • On-site active transportation linkages, bike parking and shower facilities • Telework or flexible work-hour programs • Video/teleconferencing • Office locations near transit service • Parking pricing • Parking cash-out programs • Emergency Ride Home programs
School • Students • Parents • Staff	• Walking school buses • "School pool" ride-matching • Cycling skills training • Sustainable transportation curriculum • On-site active transportation linkages and bike parking • On-site parking restrictions
Post-secondary Institution • Students • Staff • Faculty	• Universal transit passes (U-PASS) • Ride-matching • Parking pricing • Virtual classes • On-site active transportation linkages, bike parking and shower facilities
Household • Individuals and families in their own neighbourhoods	• Individualized marketing • Community-wide ride-matching • Car-sharing • Location-efficient mortgages • Developer-provided transit passes
Community-wide, Commercial & Institutional • Users of particular transportation services or facilities • Users of particular community services or facilities • Specific population segments	• Transit fare discounts • Parking levies • Transit service branding • Special community events and challenges • Online trip planners • Real-time transit information • Road pricing (tolls) • Distance-based vehicle insurance • Shuttle services between community centres, transit stations, hospitals, shopping centres • Partnerships between transit service providers and car-sharing services
Corridor • All those travelling to, from or through the corridor	• Various measures concentrated along a particular travel corridor • Transportation management associations • Shuttle services

Table 2 : Initiative Types and Target Markets

2.3 Lessons From Elsewhere

Transportation Demand Management efforts in metropolitan areas around the world have led to several important lessons (both opportunities and challenges) that are applicable in the GTHA context.

WORK WITH PARTNERS AND STAKEHOLDERS

Build understanding of TDM – The concept of TDM gained prominence in the 1990s and 2000s at the same time as traffic calming, active transportation, intelligent transportation systems, climate change and other "unconventional" tools and issues. Because TDM is broad and difficult to define precisely, this has led to confusion among the public, elected officials and senior municipal staff abou what TDM actually is and what it can do. Stakeholders in the private sector may also need to be educated about their important role in managing demand and the benefits they may obtain by doing so.

Find champions – Transportation Demand Management strategies and initiatives need effective, influential champions. Otherwise, political and public attention is easily diverted to subjects that appear more urgent and concrete. Building success in TDM requires the development of human relationships and carefully designed services, both of which can be upset by even a minor disruption in continuity. The support of high-level champions is needed to avoid the "stop-and-go" syndrome of ineffective and wasteful short-term programs.

Alignment is essential – All levels of government should examine land use and transportation policies, programs and messages to ensure that they are not contradictory. Lack of alignment can confuse consumers or, even worse, undermine the credibility of the efforts to change behaviours. An example is the fact that employer-provided transit benefits are taxed, while free parking for employees is almost never taxed as a benefit.[3] Another aspect of alignment is leading by example; "walking the walk" is an effective way for governments to validate their own messages.

Leverage partnerships – Government agencies have a vital role to play, but are not necessarily ideally suited to deliver every TDM initiative. A variety of partners, including Transportation Management Associations (TMAs), schools, business organizations and interest groups, can offer flexible and efficient mechanisms, a deeper reach into the community and greater credibility with key audiences. The TMAs specialize in delivering TDM programs to member groups, employers and institutions.

TAKE A STRATEGIC AND FOCUSED APPROACH TO MARKETING

Promote realistic travel options – Promoting transit use in far-flung business parks with poor transit service, in downtown areas where transit vehicles are already over-capacity or to those who would have to make three transfers, will have limited success. Conversely, it can be very effective to strategically target transit promotion in areas where service is good or where improved facilities or services are being put in place. Another alternative is to explore innovative models of service delivery.

Take a multi-modal approach – There is a staggering variety of individual needs and circumstances around travel decisions. When communicating with an audience about one travel option (e.g. ride-sharing), it takes little in the way of extra resources to also address other options like transit, cycling and telework. Doing so maximizes the potential benefits as not everyone is interested in any given option, and some people are interested in more than one.

Focus on people who are open to change – Some people simply have no desire or flexibility to adopt new travel behaviours. It is more effective and efficient to target resources at those who have an interest in making different decisions: families moving to a new neighbourhood, students leaving home for the first time or newly recruited employees at a company or workers whose office is relocating. That said, there is always room for information to help guide everyone to make better choices, including selecting energy-efficient vehicles.

Target travellers at both ends of their trip – Barriers to change may exist at the home end of commuters' trips. Other barriers may exist at the work end. Addressing only one trip end will not effectively overcome these obstacles.

Information works – Many people's behaviour can be changed simply by ensuring that they understand their travel options. Non-transit users rarely have a good understanding of how quick and convenient their transit options may be. Cyclists who think on-road cycling is dangerous may be unaware of nearby off-road routes or may benefit from skills training. Many drivers do not add up the true costs of owning and operating their cars.

3 Except where leased spaces are reserved for specific individuals, but this is a relatively rare circumstance.

Image counts – Commuters who have a choice can be swayed through sophisticated branding exercises that add value to certain choices (e.g. York Region Transit's VIVA service).

PROVIDE INCENTIVES, DISINCENTIVES AND INFORMATION

Pricing is vital – Many travellers only consider "out-of-pocket" costs (transit fares, parking costs, tolls) when planning their trips. In suburban environments where parking is free, transit can seem expensive to those who have a car sitting in the driveway. Efforts to "level the playing field" by charging automobile users for their use of roads and parking lots, and by reducing the relative costs borne by transit users, are therefore critical to long-term success.

"Carrots and sticks" work best in combination – Disincentives (e.g. congestion pricing) are more effective and less likely to be seen as punitive when they are accompanied by incentives such as timely and significant improvements in the availability and quality of transit services. The converse is also true; coupling TDM measures with specific projects, such as a new development or a new transportation project, can be effective in increasing uptake.

Use the power of technology – Technologies like online trip planners, real-time transit information and automated text messages can contribute to a modern vision for travel choices such as transit. They can also represent an affordable way to reach customers with customized, relevant information when they are making travel decisions — which is the most desirable time in which to do so.

Be patient – Transportation Demand Management, like all efforts to modify human behaviour, can take time to reach its full effect. Not everyone is open to change at the same moment in time so maintaining an "open door" for travellers to make new choices can be more effective. For this reason, recurring efforts at outreach and communication are necessary.

The Potential of Individualized Marketing

Individualized marketing has been used around the world to help people make more sustainable travel choices. The approach is simple: focus on giving customized information and training to people who want to change the way in which they travel.

Portland, Oregon was the site of the first large-scale individualized marketing project in North America. The project, called *TravelSmart*, reached more than 14,000 people in 2004 after a new MAX light rail line was opened in the city's Interstate/avenue corridor. As part of the evaluation process, a control area was used to determine what changes in travel behaviour were due to the new light rail line and what changes were due to the addition of individualized marketing in the target area.

During the project, thousands of households in the target area asked for and received information on transit, walking and cycling. Some also received a personal home visit from trained staff. Subsequent surveys showed that after the light rail line opened, the growth in transit trips was 24 per cent in the control area, but 44 per cent — almost twice as much — in the *TravelSmart* area. Greater increases in biking and walking also occurred in the *TravelSmart* area, which (together with greater transit use) increased individuals' physical activity levels by two hours each month. The net effect on driving levels was significant. *TravelSmart* area residents drove 14 per cent less after the light rail line opened, while residents of the control area drove only eight per cent less.

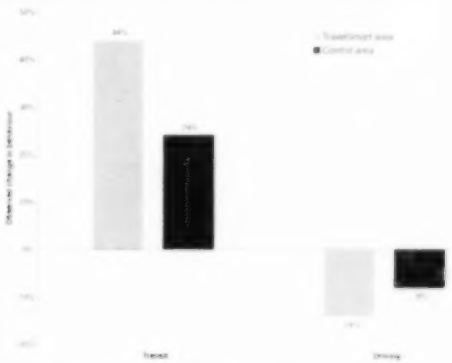


Figure 3 : Portland's TravelSmart program results.

For more information, see www.portlandonline.com/transportation

Table 3 : The Potential of Individualized Marketing

Parking Management for TDM

Parking management is one of the most powerful TDM tools available. It is a flexible and effective policy tool that, when applied properly, has been shown to have a positive impact on encouraging sustainable travel options and in reducing the demand for the personal automobile. One prime example is downtown San Francisco where sweeping reforms to residential parking standards have been introduced, such as:

- Eliminating minimum parking requirements for downtown housing, allowing developers to provide little or no parking if the situation warrants;
- Establishing maximum parking ratios for all dwelling units. Developers and individual tenants are free to secure additional parking spaces off-site. These maximum parking limits ensure that developers will not build surplus parking capacity in an attempt to make their buildings more attractive to buyers;
- Require secure bicycle parking city-wide for residential buildings;
- Require that parking spaces be sold/leased separately from dwellings in projects of more than 10 units, and provide exceptions for affordable housing projects; and
- Require car-share spaces city-wide at the ratio of one dedicated space for car-sharing vehicles for each 200 dwelling units. This ensures the survival of car-sharing programs by mandating that there must be spots available for these vehicles.

Picture 1 : Parking spaces reserved for Zipcar and AutoShare vehicles are scattered throughout the GTHA, although, at present, most are in Toronto.

Table 4 : Parking Management for TDM

Publicly Operated Vanpools

Vanpooling is an attractive travel alternative in suburb to suburb travel, and can make transit a viable alternative where demand does not justify bus service. It is similar in concept to traditional carpooling with the difference being that the vehicle (a van in most cases) is supplied by employers, non-profit organizations or government agencies. Vanpool members pay a fee that may exceed that of a monthly transit pass, and drivers are volunteer members of the vanpool. Vanpooling is often found servicing longer-distance trips in low travel-density corridors where effective public transit services are impractical or not yet in place.

The Puget Sound Region in Washington has the largest and oldest public vanpool program in North America. The vanpool programs are operated by the six public transit agencies in King, Kitsap, Pierce and Snohomish Counties in the central Puget Sound Region and in adjoining Island and Thurston Counties. Together, the programs sponsor nearly 1,300 vanpools and the region leads North America in vanpooling, both in the number of public vanpools and in the ratio of vanpools per capita. Two per cent of commute trips in King County and seven per cent of commute trips longer than 20 miles are served by vanpools.

While the vanpools are provided by transit agencies, employers play a very big role in the success of the vanpooling program by actively marketing vanpooling to employees and by subsidizing vanpool fares for their employees. An important factor behind the success of the Puget Sound vanpooling program is state legislation that mandates commuter trip reduction programs, resulting in 86 per cent of vanpools being destined to workplaces that fall under the mandatory program.

The Société de Transports de Montréal (STM), the city of Montreal's public transportation authority, operates taxibus services between commuter train stations and office parks or low-density residential neighbourhoods. Customers pay a standard STM fare to use the taxibus service, which is operated by a few different taxi companies. Certain STM taxibus routes operate in a similar fashion to fixed-route conventional transit. For example, STM's taxibus service on the Aldo Distribution Centre (Saint-Laurent) route, which operates from Monday to Thursday from 11:30 p.m. to 12:15 a.m., picks up customers every five minutes at five taxibus stops along the route. This is in contrast to the dial-a-ride service offered by certain GTHA municipalities, including Burlington and Oakville, which operate "demand-responsive" services. In this system, customers must call the municipal transit authority ahead of time, are picked up at the requested bus stop, and are driven to the closest transfer point where regular transit service is operating.

Source: *Puget Sound Vanpool Market Action Plan*, 2003; Victoria Transportation Policy Institute TDM Encyclopedia

Picture 2 : Vanpool programs are common among employers in areas underserved by local transit.

Table 5 : Publicly Operated Vanpools

3 TDM in the GTHA

3.1 Past and Present

There has been considerable momentum over the last five years towards a greater role for TDM. This momentum is due to a range of factors including: deteriorating traffic conditions; growing environmental awareness; the launch of the *Smart Commute* program; and the success of the Highways 404 and 403 High Occupancy Vehicle (HOV) lanes. Unfortunately, the overall trend in the GTHA over the past 20 years has been toward increasing reliance on the automobile as a primary mode of travel. Furthermore, as the automobile's share of travel has grown, the proportion of cars on the road with only one occupant (Single Occupant Vehicles or SOVs) has risen from 75 per cent in 1981 to 85 per cent in 2006. This means that not only are a greater proportion of person-trips being made by automobile, but also more cars are ending up on the roads per person-trip, thus compounding the overall impacts. Transportation Demand Management tools and policies that have been tested in the GTHA include regional initiatives such as *Smart Commute* and employer-specific programs in both the private and public sectors. This section provides an overview of TDM planning and programs undertaken recently by municipalities, universities, and other employers across the GTHA.

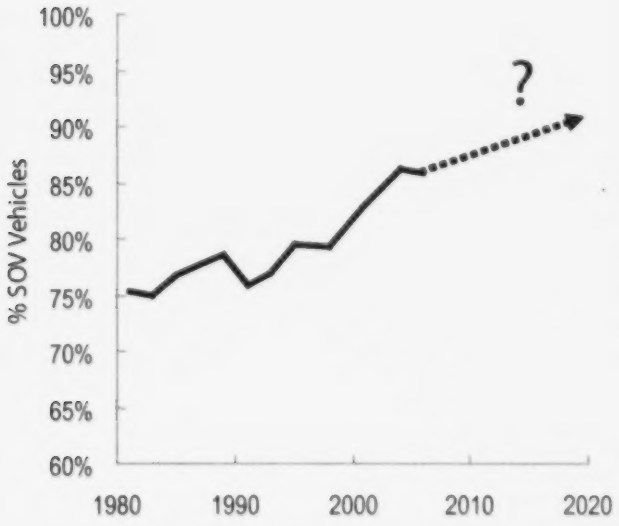


Figure 4 : The proportion of auto trips without any passengers is growing.

Source: 1981-2006 Cordon Counts (weighted average), Data Management Group

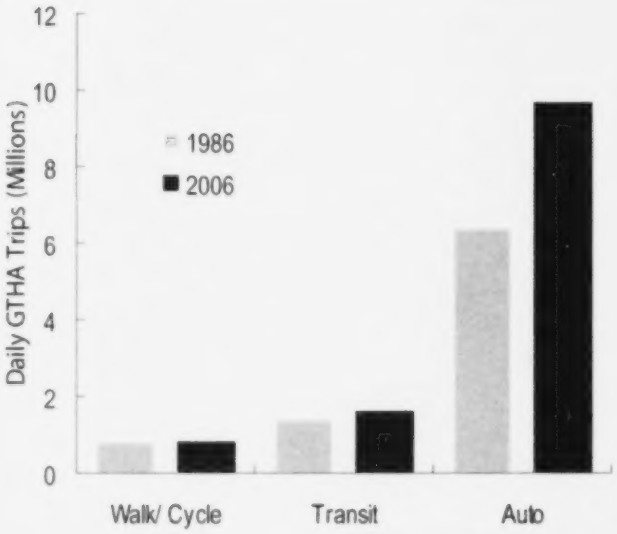


Figure 5 : The number of auto trips is growing faster than any other mode.

Source: *Transportation Tomorrow Survey* (2006)

SMART COMMUTE

Most developments and policies in the area of workplace TDM in the GTHA now fall under the umbrella of the *Smart Commute* organization. *Smart Commute* was established by the municipal governments of the GTHA, with financial support from Transport Canada's Urban Transportation Showcase Program, to develop and promote a network of initiatives designed to give commuters new options. In January 2008, *Smart Commute* became a part of Metrolinx and will continue to support the implementation of TDM measures across the GTHA.

Smart Commute supports a network of TMAs, or local *Smart Commutes*, across the GTHA. Since 2004, local *Smart Commutes* have been launched in Markham and Richmond Hill, Mississauga, Northeast Toronto, Brampton-Caledon, Halton, Durham and Central York (Newmarket and Aurora). Future *Smart Commutes* are planned for Hamilton and downtown Toronto.

Local *Smart Commutes* help target individuals in key markets offering customized local services including:

- Carpooling programs;
- Cycling programs;
- Vanpool assistance;
- Shuttles and Emergency Ride Home programs (ERH, a kind of "commuter insurance");
- Employee work arrangement solutions, including telework, flexible work hours and compressed work weeks;
- Site assessment and surveys; and
- Incentives, promotions and events (e.g. Commuter Challenge).

The local *Smart Commutes* have, to date, contacted more than 2,500 employers with more than 100,000 employees and signed up over 50 medium- and large-sized employers. A cornerstone of *Smart Commute* is the Carpool Zone ride-matching service. It was launched in November 2005 at the same time that the new HOV lanes were opened on Highways 403 and 404.

In 2005-2006, *Smart Commute* conducted a region-wide attitudinal survey of 1,000 commuters to establish a project baseline and to support marketing efforts. The survey found that half of respondents commute alone in their cars and that three-quarters of them have free parking at work. Employee commuting surveys were also completed with six employers in four different *Smart Commutes*. These surveys provide a baseline measurement of commuter characteristics, perceptions toward transportation choices, and personal willingness to switch travel modes.

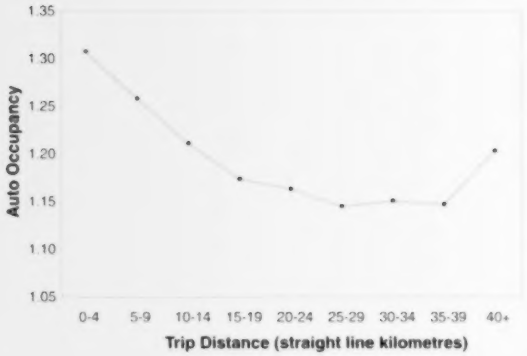


Figure 6 : Average auto occupancy varies by trip distance.

Source: *Transportation Tomorrow Survey* (2006)

EXISTING POLICIES AND PLANS

Despite differences in awareness and implementation across the GTHA, TDM is receiving increased region-wide attention at the policy and planning levels. Several municipalities have developed specific plans related to TDM and, even where specific plans are lacking, some municipalities have now signed on with *Smart Commute* to create TMAs. In addition, many have created new TDM coordinator positions to liaise with the *Smart Commute* secretariat and local TMAs.

Transportation Demand Management is also playing a growing role in GTHA municipalities' Transportation Master Plans. Many plans contain targets for reducing SOV trips. The following table shows some examples:

Municipal Plan	TDM Goals and Recommendations
Oakville – Transportation Master Plan (2007)	• Hire a City of Oakville TDM coordinator, in addition to a Halton Region coordinator
Durham – Transportation Master Plan (2003), Setting the Stage for TDM (2006), TDM Study report (2007)	• Develop a TDM program in Durham Region • Hire a TDM coordinator • Pursue funding for TDM initiatives • Develop TDM-supportive land use guidelines and checklist • Launch *Smart Commute* Durham with Region to deliver services
Hamilton – Travel Demand Management Policy Paper (2005)	• 20 per cent reduction in auto vehicle kilometres of travel by 2031 through mode shifts and other TDM measures • Hire a TDM coordinator
Peel – Transportation Demand Management Study (2004)	• Integrate TDM into Transportation Master Plan and Official Plans • Coordinate with *Smart Commute*, area municipalities and stakeholders • Develop five-year TDM action plans • Identify TMAs
Brampton – Transportation and Transit Master Plan (2004)	• Implement TDM programs for city staff • Provide start-up support for a car-sharing initiative downtown • Create and support TMAs for key areas of high commercial/industrial activity • Develop and undertake a social marketing campaign for major employers and residents
York – Transportation Master Plan (2002)	• Establish network of HOV lanes • Hire a TDM coordinator • Revise land use and parking policies to support TDM

Table 6 : Examples of targets for reducing SOV trips

OTHER PROGRAMS

Several examples of other TDM tools or initiatives in the GTHA do not fall under Smart Commute:

- Online trip planners for transit agencies (e.g. Mississauga Transit, Hamilton Street Railway, Brampton Transit, York Region Transit) that permit users to enter their travel time, origin and destination and have the website display the best transit route
- TDM programs at several colleges and universities in the GTHA, typically motivated by parking shortages, that usually include universal transit pass (U-PASS) programs
- Electronic tolling on Highway 407 that varies by time of day and vehicle type
- The Presto Smart Card pilot project that integrates fare payment across regional transit services
- Active and Safe Routes to School programs that encourage children to walk and bicycle to school
- HOV lanes in the GTHA that encourage carpooling (to be addressed in detail in Green Paper #6, entitled *Roads and Highways*)
- City of Toronto cycling promotion and CAN-BIKE education efforts
- City of Toronto's requirement for a TDM plan as part of development applications
- Bulk transit pass sales by Toronto Transit Commission (TTC) and York Region Transit
- Transit pass sales for certain groups, for example, discounted transit fares provided by local transit authorities for riders connecting to GO Transit.

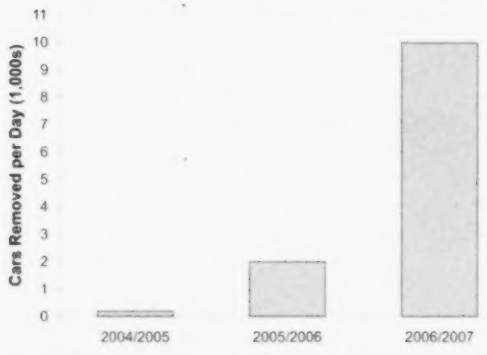


Figure 7 : Smart Commute is having a growing impact on trip reduction.

Source: *Smart Commute* Initiative: Effective Congestion Relief Flyer

EFFECTIVENESS TO DATE

Within the GTHA, the TDM measures outlined above have shown promising early results. A recent survey of commuters in the busy Highway 400 corridor suggested that 19 per cent currently telework occasionally and that a further 30 per cent would like to do so if the option was available.[1] More specifically, *Smart Commute* has shown encouraging results; an estimated 10,000 car trips a weekday were eliminated by March 2007 from a combination of telework, transit, cycling and carpooling efforts,[2] up from 2,000 just a few years ago. *Smart Commute* also recently presented awards to eight major employers for their efforts in reducing auto trips, showing that organizations are starting to realize the importance and potential of these initiatives.

The recently implemented HOV lanes on Highways 403 and 404 have been an immediate success, with forecast usage levels for the end of the first year achieved within a few months of opening. Travel time savings of eight to nine minutes, compared to adjacent general traffic lanes, have attracted carpoolers. These corridors saw an increase in peak morning period carpools from 15 per cent to 40 per cent after one year of HOV operation lanes. In addition, GO Transit buses have experienced decreased travel times and increased reliability as a result of the HOV lanes on these highways. The overall person-carrying capacity of both highways exceeds that of comparable non-HOV routes and significant HOV lane capacity remains to accommodate future growth. Additional efforts are required to align TDM initiatives with existing and future HOV infrastructure across jurisdictions in order to maximize the benefits of both.

To date, the overall impact of TDM in the GTHA has been relatively small. However, the rapid pace of growth implies that continued efforts could have much more significant impacts in the foreseeable future.

3.2 A Vision for the Future

The vision for TDM in the GTHA is to establish effective and efficient programs and strategies that will motivate more sustainable transportation decisions by people, businesses and governments. Transportation Demand Management will have a fundamental role to play in making the best use of existing facilities and maximizing the return on future investments in public transit, active transportation, roads, and goods movement. It will help ensure that the GTHA's transportation system is being

1 *GTA Commuter Behaviour Survey*, 2006
2 *Smart Commute* Initiative: Effective Congestion Relief flyer

used as efficiently as possible. It will support and be consistent with the province's policy directions in the *Growth Plan* on transportation and, in particular, the policy stating that municipalities will develop and implement TDM policies in Official Plans or other planning documents to reduce trip distance and time, and increase the modal share of alternatives to the automobile. Through targeted actions and programs, the GTHA can become a TDM leader in North America.

What If?

Almost nine in 10 vehicles leaving Toronto in the afternoon peak hour in 2006 had one occupant. If TDM could increase the number of occupants per car by just 10 per cent, it would eliminate some 10,000 cars crossing the city's border at this time, equivalent to about five highway lanes of traffic.

BRING TDM INTO THE MAINSTREAM OF PUBLIC LIFE, PLANNING AND DECISION-MAKING

The first component of the TDM vision is to bring it to the mainstream.

For the public, TDM products and services should simply be a part of everyday life. By comparison, recent surveys show that only 10 per cent of GTHA commuters recognize the *Smart Commute* name.

For local, provincial and federal governments, TDM should be built into all processes and structures related to land use and transportation. Transportation Demand Management measures should cease to be viewed as an "add-on" to other initiatives and should be recognized as equally important as land use and transportation supply changes in bringing about more sustainable transportation. This implies a much larger (but more cost-effective) investment in TDM and a commitment to operate at a scale that is effective. All municipalities should have TDM strategies with close links to their Official Plans. Governments should have staff resources dedicated to TDM with broad integration of TDM into staff recruitment criteria and training curricula. Staff teams working on land development and infrastructure projects should include TDM experts. Municipalities should require that development proposals provide TDM strategies as part of their application requirements.

While *Smart Commute* workplace programs in the GTHA now have in the order of 50 companies signed on, the ultimate target should be to include virtually all medium- and large-sized employers in the GTHA in formal TDM programs. Transportation Demand Management initiatives should be as integral to the regular course of business as environmental management, and employee health and safety programs.

BUILD TDM INTO INFRASTRUCTURE INVESTMENTS

The essence of TDM is to make optimal use of all transportation system components. As a result, it no longer makes sense to plan major infrastructure supply investments without looking at how to optimize and manage demand at the same time. As we build networks of HOV lanes on highways or invest in light rail networks, we must also build public awareness and understanding of those options and offer incentives and disincentives to maximize their use. The vision is one of coordinated planning of TDM in concert with transportation supply decisions and investments.

As a possible sign of things to come, it should be noted that the federal government has signalled its intention that transit and road projects supported by the Building Canada Fund (including relevant *MoveOntario 2020* projects) will require complementary TDM initiatives to maximize the return on investment.

USE "CARROTS AND STICKS" TO MOTIVATE BEHAVIOUR CHANGE

Transportation Demand Management is most effective when a full range of incentives and disincentives, along with education, promotion and outreach, are applied.

Two of the most powerful TDM tools are parking management and user-pricing, measures that, when implemented effectively and fairly, can bring about significant changes in travel behaviour, spreading congested traffic patterns and allocating use more effectively.

ADVANCE TO THE FOREFRONT OF TECHNOLOGY SOLUTIONS

The final element of the TDM vision is to position the GTHA at the forefront of technology solutions in moving towards a customer service-focused transportation system. There are a wide range of solutions that can improve the overall travel experience by providing individuals with

the best and most up-to-date information on their transportation options, while seamlessly linking together all modes of transportation in the GTHA.

3.3 Key Issues

The RTP must address a number of strategic TDM issues. As discussed previously, TDM initiatives include both incentives and disincentives and additional "carrots and sticks" will require careful consideration. The following section discusses some of the key issues that need to be addressed when working towards the vision for TDM.

TRANSPORTATION PRICING

User fees for transportation works, including roads, parking lots and public transit, can serve a number of important functions going forward.

The province has already committed $17.5 billion to infrastructure needs through *MoveOntario 2020* and the RTP will likely identify additional investment needs. User-pricing could provide a revenue stream to help fund a variety of transportation infrastructure investments and projects, minimizing reliance on general tax revenues.

Pricing also helps to ensure that infrastructure serves the most economically important trips. Economists have shown that when goods or services are free, people tend to use too much of them and not efficiently spread their use over time. With targeted pricing, such as for drinking water, electric power, cellular airtime or on-street parking fees, municipalities and utilities have helped delay or reduce the need for new infrastructure and have ensured sufficient capacity for everyone. Differential prices (e.g. higher prices for electricity at times of higher demand) can motivate users to time their utility use differently over the course of a day or week.

User-pricing can help motivate individual traveller decisions to favour more sustainable travel modes (e.g. walking, cycling or transit) that use less energy and reduce emissions. Revenues generated from transportation pricing could be used to make those choices even more attractive through increased investment. Examples of pricing tools include: distance-based vehicle registration fees; distance-based insurance premiums; fuel taxes; emission charges; parking fees; and road pricing (with, notably, the Highway 407 Express Toll Route being the only meaningful example of road pricing in Canada and one of the most technologically sophisticated in the world). The role of such tools in funding the achievement of a desired transportation vision in the GTHA warrants further examination and discussion.

As an example of how the variables of transportation pricing need to be weighed to maximize the benefits, the RTP may consider different forms of road pricing. There are four types of road pricing systems, all of which charge users to drive on a particular road or in a particular area. They are:

- **Area-wide pricing** – Charges for total distance travelled on all roads within an area. These applications rely on advanced GPS (Global Positioning System) technologies and have the capability of varying the charges by congestion levels.
- **Cordon pricing** – Charges to motorists for entering or driving in a designated area (e.g. a downtown). These systems can charge either a fixed or variable fee and can be implemented using transponders and cameras.
- **Variable road tolls** – Roads are tolled using rates that vary by time of day or dynamically with traffic conditions, encouraging motorists to use the facilities outside of peak periods (e.g. Highway 407).
- **Variable toll lanes** – Similar to the above example, except tolls are applied only on designated lanes that are less congested and thus more attractive. These lanes are generally on highways and take the form of express toll lanes or High-Occupancy Toll (HOT) lanes where solo drivers or vehicles without the required number of occupants pay a toll to use HOV lanes.

Congestion pricing describes road pricing systems that have the main objective of reducing congestion with the best known example being the cordon congestion charging system in London, England. Congestion pricing can be effective as a TDM tool because it can shift some peak period trips to other transportation modes or to off-peak periods allowing traffic to flow more efficiently. Congestion pricing can also be used in conjunction with other TDM tools, such as offering a discount on tolls to transit pass holders.

Road pricing schemes must be carefully planned to ensure the existence of attractive transportation services to accommodate those who choose to change modes. Consideration of economic impacts on tolled areas or corridors is required. For example, cordon pricing systems can affect businesses inside the charging area. Pricing can also stress transit systems (such as the GTHA's) that cannot handle an influx of new riders without significant new

infrastructure. To help alleviate this, road pricing revenues can be directed to pay for new infrastructure through finance bond issues, which enable the acquisition of transit vehicles and facilities ahead of road pricing implementation. Road pricing revenues can also be allocated to improve the safety and efficiency of walking and cycling infrastructure, promote increased active transportation or redistribute to transit services.

In the GTHA, a combination of approaches could permit equitable implementation of transportation pricing which encourages sustainable travel choices and generates much-needed revenues for transportation improvements while minimizing local economic disadvantages.

LAND USE AND PARKING MANAGEMENT

As can be observed from the travel patterns and urban structure of the GTHA, we have been very effective in building a car-oriented metropolitan area. Dispersed development patterns, low densities, high-speed roads and large parking lots all contribute to making the private vehicle a comfortable and quick mode of transport for many trips. Since suburban land use patterns are not transit-supportive in many cases, it is difficult to justify the investment required to provide the quality of transit services necessary to compete with the automobile. Compounding this challenge is the issue that the true costs of auto use are not borne by motorists. Parking is a prime example.

Large surface parking lots are a mainstay of the GTHA urban landscape outside of central areas. With the exception of downtown Toronto, pedestrian-oriented commercial venues and other high-demand areas such as hospitals, parking is normally "free". Parking is not cheap to build or maintain (an owner would need to charge about $40 per month or $0.50/hour to recover the construction costs and ongoing maintenance costs for a surface parking space, excluding land costs). This means that someone else absorbs the cost of parking. In the case of a shopping mall, the high cost of parking translates into higher rents for individual stores, which translates into higher prices for goods, which all consumers pay regardless of whether they drove alone, carpooled, took transit or walked.

Picture 3 : Large surface parking lots provide little incentive for use of more sustainable modes of travel.

Why does the trend to provide ample, free parking matter to TDM? First, if each worksite, school, and shopping destination has enough parking for all visitors to arrive by SOV, there is much less incentive for this entity to engage in TDM programs. Conversely, insufficient parking supply and the prohibitive cost of building new parking facilities is the prime motivation behind many TDM success stories, such as York University. Second, if parking is free, there is little incentive for an individual to carpool, vanpool or use other sustainable modes. Studies have shown that individuals are more responsive to changes in parking costs than to vehicle operating costs (e.g. gas prices within the recently experienced range of gas price fluctuations). In a recent survey of Toronto residents, almost one-quarter of SOV commuters stated that they would shift to another mode if parking at their place of work was not free. [3] Similar results have been reported for Portland, Oregon and Los Angeles, California. Third, supplying large amounts of parking, usually in front of buildings, makes access by foot or by public transit more difficult.

If parking costs so much to provide, then why does ample and free parking seem to be almost a "given" with most new development in the GTHA? There are many factors that influence the supply of parking:

Parking requirements in zoning by-laws – Most municipalities in the GTHA have minimum parking standards that require new development to provide sufficient off-street parking to accommodate peak parking demand on-site. Minimum parking standards are now widely criticized for increasing the costs of development, reducing the potential for market pricing of public parking facilities and encouraging auto use. Outside of the City of Toronto, zoning by-laws typically do not actively support shared-parking practices.

Industry practices – Shopping centres typically supply sufficient parking spaces to meet the demand associated with one of the busiest times of the year, roughly corresponding to the Saturday afternoon before December 25. Using this practice, at least one-half of a shopping centre's parking spaces will be vacant a minimum of 40 per cent of the time. Abundant, free parking supply is viewed as critical to attracting customers.

Marketing considerations – Most offices and business parks require access to parking, regardless of proximity to transit and active transportation facilities. Ideally, offices would be located in municipal centres as part of a vibrant mixed-use area conducive to live, work and play. In order to supply parking in these dense areas, the smaller footprint of structured parking is ideal; however, the costs of building structured parking are considerable. As a result, office developments in municipal centres become economically uncompetitive compared to lots near 400-series highways, which have space to provide ample surface parking at a much lower cost.

Anticipated parking demand and existing parking supply – Given the cost of providing parking, less parking may be provided if the site is well-served by transit or within walking distance of target markets. Similarly, if there is existing parking supply nearby that is available to site visitors (e.g. paid public parking) a developer may be inclined to provide less on-site parking.

Parking facility and real estate costs – As property values and construction costs increase, the supply and financing of parking facilities must be given more careful consideration. Excluding property costs, the cost of providing structured parking is approximately three to five times the cost of surface parking. It is, therefore, more likely that parking in structures is priced than in surface lots.

Clearly, a multi-faceted approach is required to encourage parking management approaches that support TDM and more transit-supportive development. Municipal zoning by-laws regulating parking standards need to be reviewed and reformed. Better transit options need to be provided. Employer parking lots and Park-and-Ride lots at transit stations should provide multiple-occupant vehicles with favoured parking locations in the lot and possibly reduced rates. Office leasing criteria need to be better aligned with the needs of businesses. Shared parking needs to be encouraged. Developers, employers and other institutions need to be educated on the economic benefits of parking management and TDM. Municipalities need to provide strong leadership to begin to change attitudes and practices.

THE ROLE OF TECHNOLOGY

Picture 4 : The introduction of an integrated fare card will improve customer convenience for travel across multiple borders.

Technology can play either an integral or complementary role within TDM initiatives. It can take an existing transportation network and make it run smoother, faster and present a more customer-oriented product. Technology solutions have the strong benefit of being relatively low-cost while offering a "quick win" solution to improve system image, loyalty, reliability and performance.

The GTHA has numerous examples of different technologies being used in varying ways. The following section describes two areas of focus where transportation technology is being used today to help manage travel demand and provides an overview of how this work can be expanded for further benefit. The focus of this section is on technologies that provide greater information, added flexibility and system integration to users which includes traveller information and trip planning and electronic payment and smart card technology. Technologies that are more focused on transportation supply and operations (e.g. transit signal priority, transit vehicle location and highway incident detection, ramp metering) are not covered in this section and will be presented in the *Roads and Highways* and *Transit* Green Papers.

Smart Cards and Electronic Payment

Residents of the GTHA were first introduced to electronic payment with the 407 Express Toll Route (ETR) transponders, allowing users to be billed automatically for using the toll highway without needing to stop at traditional toll plazas. The benefits of electronic payment are now being introduced to public transit services with the continued rollout of the Presto Smart Card which allow riders to move across the GTHA with a single fare card. The main drive behind the Presto Smart Card is to improve customer convenience as it represents one less hurdle to

3 2005 attitudinal survey of 1,433 Toronto residents over the age of 16 as reported in *Commuter Attitudinal Survey* 2005, Transportation Planning, City of Toronto, July 2006

commuter traveling across multiple transit agencies' borders. The benefits of the Presto Smart Card to transit users in the GTHA are as follows:

- **Easy transfers** – Users will be able to move within and between transit systems, such as from a local bus to a GO Train, without worrying about what the different fares are and needing the correct change or a transit pass for each individual system. This may include the introduction of fare integration, allowing transit users to avoid paying twice or systems that are based on distance travelled.
- **Faster boarding** – Smart cards eliminate the need for operators to check individual rider's tickets and passes, paving the way to proof-of-payment systems on high-demand routes that can greatly improve transit speeds and reliability.
- **Convenience** – There is no longer any pressure on users to find the exact cash or the right ticket and bottlenecks at ticket booths will be reduced. Users will be able to add money to the fare cards in person, via a website or call centre or through pre-authorized payments.
- **Peace of mind** – Presto Smart Cards will be registered so they can be replaced and the value restored if lost or stolen.
- **Extensions** – The opportunity exists to extend the use of the cards to other applications, including payment for parking, library services, city services or even as an electronic "purse" to be used at a registered private business. These joint promotions can include discounts and loyalty rewards to transit pass holders.

Traveller Information and Trip Planning

Anyone who has driven along a GTHA highway likely has noticed the electronic displays identifying travel conditions. These signs are designed to provide real-time information related to current conditions on the regions' highways. Drivers receiving this information are then able to make informed navigation decisions and avoid congested areas leading to delay. From an overall "system" perspective, demand for individual transportation facilities can be managed, and traffic can be balanced between routes that are over-capacity and those that can support additional vehicles. For transit users, traveller information systems are also becoming much more prevalent in the GTHA. Technologies such as next bus arrival signs at transit stops and automated stop announcements using GPS satellite technology are being deployed in transit systems across the GTHA. York Region Transit's VIVA system was the local pioneer in this area.

Traveller information systems, as described above, help users optimize travel decisions and improve the travel experience while on the road or on transit. A second category of traveller information system, trip planning, offers users tools that can be accessed at home, at work or en-route to plan out trips in advance. As an early Quick Win project, Metrolinx is currently collaborating with GO Transit, TTC and other transit and transportation providers across the GTHA to implement a one-stop integrated trip planner system to be hosted at www.metrolinx.com. Users will be able to key in origin and destination point, and the trip planner will display departure and arrival times, connection opportunities, fares and a route map. The planner will also have links to real-time traffic and weather conditions, traffic incident reports, and airport and border crossing delays. Metrolinx will also introduce a carbon footprint calculator feature which will measure the impact of individual transportation and travel decisions on air quality and the natural environment.

Some additional initiatives that would improve traveller information and trip planning in the GTHA include:

- Expanded information on transit vehicles and terminals through electronic displays and automated stop announcements;
- Regional 511 Traveller Information Services telephone hotline which can provide information on traffic, transit, cycling and ride-sharing;
- Messages to mobile devices, providing real-time information linked to the future Metrolinx trip planning system; and
- Route-planning and road information to help shift discretionary travel from peak road and transit use to secondary routes to optimize the roads system.

WHO DOES WHAT?

Two of the main challenges in establishing more effective TDM in the GTHA will be to determine who has responsibility for different elements of the TDM strategy and to establish effective partnerships among federal, provincial, regional, municipal and employer-based organizations. Due to the highly local nature of the relationships essential to many TDM initiatives, the current arrangement of local TMAs falling under the *Smart Commute* umbrella has great potential as an implementation model.

An overview of the different levels of responsibility for TDM is provided below:

Through the federal government, Transport Canada has provided funding for sustainable transportation pilots and programs (including several TDM initiatives) and is about to launch a TDM-focused program called ecoMOBILITY. The federal government is also responsible for national taxation policy, including issues such as tax exemptions for employer-provided transit passes and the fiscal treatment of employer-provided parking. At the provincial level, the government is directly responsible for transportation policy, although the *Greater Toronto Transportation Authority Act* has transferred much of the responsibility for transportation planning to Metrolinx. The fiscal framework that influences industry and individual behaviour (e.g. through fuel taxes, property taxes, development charges and licensing and registration fees) is a provincial responsibility. Through the Ministry of Transportation, the province is responsible for the development of HOV lanes on its highways, as well as carpool parking lots at strategic locations. Finally, municipal governments support TDM planning and implementation through their own staff and local TMAs, in addition to determining property tax rates and controlling a significant portion of the planning framework and local transportation infrastructure. Transit authorities (excluding GO Transit) are under municipal control and, as such, have significant opportunity to supplement offered services with enhanced marketing and collaboration with local employers, particularly in conjunction with the regional trip planner and any fare integration.

Across all government types, an important role is that of leadership by example. Not only can the credibility of government messages be compromised by internal inaction, but also strong corporate efforts to implement TDM within an organization can inevitably sensitize staff and decision-makers to the importance of the issues, the scope of challenges and the nature of benefits.

The potential benefits of TDM to individuals, society, and government are numerous:

- **Efficient travel options** – By helping individuals overcome barriers to making efficient alternative travel decisions.
- **Efficient alternative travel decisions** – TDM can help people save money and time while also reaping the social, economic and environmental benefits associated with alternative modes of travel.
- **Reduced need for new or wider roads** – By persuading people to travel shorter distances, outside of peak periods, less often by SOV and on underutilized routes, TDM can reduce the demand for road network expansion.
- **Improved return on infrastructure spending** – Studies have shown that inexpensive efforts to offer quality information, and provide appropriate pricing and regulatory signals can greatly increase ridership on new transit facilities and services.
- **Reduced development costs** – TDM can reduce the size of parking facilities or access roads and can reduce neighbourhood traffic impacts that can slow down or even derail development processes.
- **Easy to implement** – TDM measures can be planned and delivered in weeks or months, rather than years, and they can be relatively inexpensive with costs based on human time and energy rather than procurement and construction.
- **Multi-modal support** – Alternatives to car use tend to work as a diverse interconnected "suite" of options. Non-drivers are likely to be transit users, carpoolers, pedestrians and cyclists at different times and for different reasons.

GTHA TDM Innovator: York University

In the late 1990s, 70 per cent of York University commuters drove alone. The institution projected significant expansion in the years ahead and foresaw growing congestion along with costly parking and infrastructure needs. In response, the university helped to lead several initiatives such as increasing daily bus service to campus by almost 150 per cent, establishing GO Transit Highway 407 express bus routes and a nearby GO Transit rail stop with a shuttle bus, providing discounted TTC monthly passes and GO Transit student ID cards, and improving carpooling and cycling amenities.

The results have been significant. Despite the university's population growth by 28 per cent from 2001 to 2006, there were 16,000 fewer daily round-trips by automobile to and from campus in 2006. Plans to build two campus parking garages were deferred (saving about $80 million) and, in 2006, 60 per cent of trips to and from campus were made using modes other than single-occupant vehicles. York University's increasing travel demand was effectively absorbed by transit, carpooling, cycling and walking.

In collaboration with York University, *Smart Commute* North Toronto-Vaughan (NTV) currently offers successful campus programs including an active Bicycle User Group (BUG) with more than 300 members, a carpooling database with about 800 registrants and an Emergency Ride Home program for staff and faculty.

Table 7 : GTHA TDM Innovator: York University

GTHA TDM Innovator: CarpoolZone.ca

CarpoolZone.ca was an initiative launched by *Smart Commute* in November 2005 to serve as a region-wide carpooling ride-match service. The Carpool Zone system works by matching commuters as close to their home and work address as possible. Registered users can specify their home and work locations, whether they would like to be a driver, passenger or both, and how flexible they are in terms of distance, departure times and other preferences. The Google Maps platform is then used to display the locations, route and match information. The route matching algorithm used considers the entire route that a commuter takes, allowing matches with commuters who can be picked up part of the way to the destination. Workplaces that are a part of a local *Smart Commute* have the option of setting up their own dedicated Carpool Zone, offering users the option of carpooling within the company. There are currently 51 registered employers with dedicated Carpool Zones now on the site.

CarpoolZone.ca now has over 5,000 active users. Since November 24, 2005, almost 900 carpools have formed through the Carpool Zone, and over 400 carpools are currently active. *Smart Commute* estimates that over 100 cars have been taken off the road per day, keeping ove 500 tonnes of greenhouse gas emissions from being emitted (so far). User satisfaction surveys show that the service has an 88 per cent satisfaction rate.

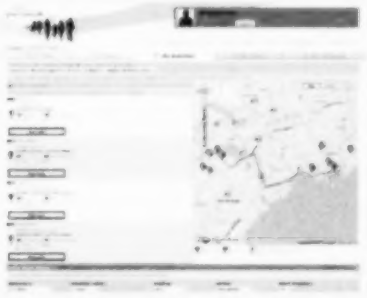


Figure 8 : Smart Commute's Carpool Zone matches drivers and passengers across the GTHA.

Table 8 : GTHA TDM Innovator: CarpoolZone.ca

GTHA TDM Innovator: Car-Sharing

Car-sharing is a relatively new initiative that is becoming more popular in the GTHA. Two private car-sharing companies operate in Toronto. In addition to a membership fee, members pay for the time and distance they drive, with 24-hour access to vehicles parked at transit-accessible locations. Research has shown that for those who drive less than 12,000 kilometres (km) annually, car-sharing is very cost-effective. Such programs succeed best in dense urban centres with adequate transit services. Though not yet fully explored in suburban areas of the GTHA, car-sharing may help households in these areas to avoid or delay the purchase of a second vehicle.

There are about 14,000 registered car-sharing members in Toronto. Car-sharing programs are effective in reducing users' overall demand for automobile travel while increasing their use of transit and active transportation. Car-sharing programs in Toronto report that 40 per cent of their members either give up a car they already own or decide not to purchase a new one after signing up. Participation has also led 27 per cent of members to use transit more often and 25 per cent to cycle more often. This supports research findings of the University of California at Berkeley which suggest that car-sharing can result in a significant modal shift to transit and active transportation and, because shared cars tend to be small and fuel-efficient, overall gasoline consumption is reduced. The research also notes that because car-share members tend to be more aware of the cumulative costs of driving (paying directly each time they use a car), they appear to be more selective when deciding whether to drive, take public transit, walk, bike or even forgo a trip. This has important lessons for other TDM pricing measures, including the possible effectiveness of pay-as-you-drive insurance and road pricing.

Montreal has shown great innovation in linking car-sharing with local transit. A partnership between Communauto, a car-sharing cooperative, and STM has improved modal integration for their users. Car-sharing memberships are available for $5 per month to all annual transit pass holders. Communauto is planning to expand its fleet to respond to the resulting increase in demand.

Source: City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts. *Transportation Research Record, 2007*, with A. Golub and B. Nee

Table 9 : GTHA TDM Innovator: Car-Sharing

GTHA TDM Innovator: McMaster University U-PASS and TDM
McMaster's TDM program, *Alternative Commuting and Transportation* (ACT), was formed in 2002 with the mandate to reduce demand for parking, both on campus and in the surrounding neighbourhoods, through the promotion of, and support for, sustainable modes of transportation. The ACT, funded entirely by parking fees, manages a number of TDM programs, most important of which is its coordination with the McMaster Student Union to support the university's U-PASS program (well-established before ACT was formed). This program provides all McMaster students with an eight-month transit pass for only $67.50 annually. An overwhelming 91 per cent of students voted in favour of the program in the last referendum. The ACT has also worked closely with GO Transit, resulting in improved service between York University and McMaster along the Highway 407 corridor, and direct service from GO's nearest "all-day" rail stations, Aldershot and Burlington. McMaster integrates several transit systems at its campus, including GO Transit, Greyhound, Burlington Transit, Coach Canada and several routes of the Hamilton Street Railway (HSR).

Table 10 : GTHA TDM Innovator: McMaster University U-PASS and TDM

GTHA TDM Innovator: In-home Personal Transportation Web Portals
To reduce the demand for automobile travel in a new 7,200-unit residential development in the City of Vaughan, a private developer is proposing a number of physical measures to support residents' use of transit, walking, cycling and ride-sharing. The developer is also proposing to make available a web portal that is customized to the occupants of each home. The portal would offer a range of information, including: • Transit information and alerts; • Carpool Zone ride-matching; • Real-time traffic alerts, traffic cameras and weather alerts; and • Interactive maps of the community, school, work and store locations. The portal would maximize convenient access to information on a full range of options for travel to destinations both inside and outside of the community. Source: "Traffic Reduction Proposal – Blocks 11, 12 and 18 in Vaughan", Report No. 6, York Region Planning and Economic Development Committee, 2007

Table 11 : GTHA TDM Innovator: In-home Personal Transportation Web Portals

GTHA TDM Innovator: Smart Commute 404-7

The *Smart Commute 404-7* TMA was formed in 2005. The program was created when the municipalities of Richmond Hill and Markham joined forces with the Regional Municipality of York, the Richmond Hill Chamber of Commerce, the Markham Board of Trade and local business leaders. Funding was provided by the Transport Canada Urban Transportation Showcase Program.

Smart Commute 404-7 was recently awarded the 2007 Transportation Association of Canada (TAC) Sustainable Urban Transportation Award. The award recognizes exemplary contributions to the enhanced sustainability of urban transportation and is given to urban transportation projects that help create communities that are more efficient, environmentally friendly and desirable in which to live.

Smart Commute 404-7 now has access to 1,800 businesses with 42,000 employees through the Richmond Hill Chamber of Commerce and Markham Board of Trade. Recent initiatives include the free "Lunch Express" service to local restaurants and businesses in the Beaver Creek and Commerce Valley Business Parks, a carpool matching program, telework assistance and parking management expertise. The association also represents the interests of the business community to government agencies and other organizations on transportation issues.

Picture 5 : Promoting Transportation Demand Management.

Table 12 : GTHA TDM Innovator: Smart Commute 404-7

GTHA TDM Innovator: Markham Centre Parking Strategy

The Town of Markham initiated a parking strategy study in 2005 to examine how it could manage parking in a way that achieved a desired urban design vision with dense mixed-use development, accelerated TDM objectives and used strategic investment to spur economic development. The study put forth a number of recommendations, from Markham managing 35 to 50 per cent of the commercial parking supply, to establishing end-state maximum parking supply targets and requiring that new developments participate in the Markham TMA and offer TDM programs. A staged implementation of off-street parking facilities would help establish a fee basis for publicly-owned and controlled streets and parking facilities, and expand to a goal of 80 per cent of off-street parking to be accommodated in structures and 20 per cent in surface lots. The parking strategy would ultimately make use of three sources for long-term capital and operating costs: user fees; cash-in-lieu payments (where developers can pay cash instead of installing parking stalls with the provision that the city supplies a spot in a municipally-operated facility); and tax increment financing.

Table 13 : GTHA TDM Innovator: Markham Centre Parking Strategy

4 Options for Action

Transportation Demand Management measures and initiatives applicable within the GTHA could be categorized in several ways:

- **Type of measure** – Potential measures include legislation and regulation (e.g. to enable vanpooling or tax-exemption for employer-provided transit benefits), municipal policy (e.g. zoning requirements for parking supply), information and education (e.g. individualized marketing), incentives (e.g. ride-matching, discounted transit passes) or disincentives (e.g. road or parking pricing).
- **Target markets** – Potential market segments can be defined by: traveller or trip type (e.g. work commuter, post-secondary students, elementary school students, families); geographic location (e.g. urban, suburban, rural, business park, downtown); and demographics (e.g. youth, elderly).
- **Target behaviours** – Potential behaviours include the use of sustainable modes like active transportation, transit, ride-sharing and telework. Other potential behaviours include more efficient driving behaviours that do not imply modal shift (e.g. trip elimination, time shifting, route shifting, carpooling or destination shifting).
- **Delivery mechanisms** – Potential mechanisms include: transit agencies; business groups; school boards; employers; developers; public health agencies; social services; transportation and land use planners; transportation management associations; and other non-governmental organizations.

This list of characteristics (measure, market, behaviour and delivery mechanism) is intended to show that TDM strategies may be designed around any one of them or even several in combination. Some examples of TDM strategies that demonstrate this flexibility might include a multi-modal incentive program targeted at suburban youth or a cycling education program targeted at downtown dwellers.

Because of this potential diversity in the design and delivery of TDM initiatives, and the need for implementation planning to account for the particulars of time and place, the possible future scenarios and strategic initiatives presented in the following section are deliberately described at a high level.

4.1 Alternative Future Scenarios: Trend, Incremental and Bold

In pursuit of the general vision described earlier in the paper, this section presents three alternative scenarios for TDM in the GTHA:

- A **"trend scenario"** that represents an extension of current practice (i.e. business as usual);
- An **"incremental scenario"** that represents the trend scenario *plus* additional initiatives that have high benefits but low risk and resource needs; and
- A **"bold scenario"** that represents the incremental scenario *plus* the most effective initiatives that are foreseeable, based on global best practices and probable areas of innovation.

Within each scenario, the key areas of TDM activity that are described include:

- Government leadership;
- Commuter travel (including workers and post-secondary students);
- School travel;
- Promotion and outreach (including home-based travel);
- Traveller information;
- Transportation pricing;
- Parking management; and
- Supportive transportation infrastructure and land use.

Issues specific to particular modes (e.g. transit, cycling) are addressed within these parameters.

OPTIONS FOR ACTION: TDM		
Government Leadership		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Some coordination of regional TDM efforts exists, but is limited. Only some municipalities have detailed community-wide TDM strategies with supportive land use and transportation policies (e.g. Official Plans, transportation policies, zoning by-laws). Municipal investment in TDM programs and services varies from none to low (relative to investment in most other areas of transportation). Most municipalities have dedicated TDM staff (usually one person), but understanding of TDM is not well developed among transportation professionals in general. A few municipalities require TDM consideration development applications, but implementation success varies. Only a few municipal, provincial and federal government offices offer effective internal commuter options programs for their employees.	There is strong regional vision and leadership for TDM efforts, complemented by municipal planning and implementation. Land use and transportation policies offer a high degree of support to TDM-supportive actions. All municipalities have staff teams responsible for TDM and allocate sufficient financial resources to achieve meaningful results. Development applications routinely commit to TDM and supportive measures, and receive follow-up monitoring to ensure compliance. **Strategic Initiatives – Trend Scenario *plus*:** • All municipalities have TDM strategies that are coordinated but reflect unique local needs. • TDM initiatives routinely accompany major transportation infrastructure and service improvements. • TDM requirements for development applications are coordinated and consistent among municipalities. • Most municipal, provincial and federal government offices have implemented effective multi-modal commuter options programs for their employees with appropriate incentives and required facility improvements.	Regional and municipal TDM strategies and initiatives are tightly coordinated. Staffing and spending for TDM are orders of magnitude greater than today, with a correspondingly high degree of results. **Strategic Initiatives – Incremental Scenario *plus*:** • All government staff receive free transit passes as a tax-exempt benefit and pay for parking. • Part-time telework for regular office staff is expected and all government agencies offer full-time telework to eligible employees. • All government offices offer adequate and secure bicycle parking, showers and change facilities for active commuters.

Table 14 : Government Leadership

OPTIONS FOR ACTION: TDM		
Commuter Travel		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Some employers offer assistance and incentives for employees wishing to use sustainable modes. A regional online ride-matching service is available for use by the general public and individual employers. Coordination and advice in some geographic areas is provided by local *Smart Commute* organizations that employers join voluntarily. Most employee parking is free other than in the largest employment concentrations. Very few employers offer transit benefits or Emergency Ride Home programs.	Most larger workplaces encourage and support commuter options (active transportation, transit, ride-sharing, telework) and workers expect it. All communities have *Smart Commute* organizations to work with employers and provide services including individualized marketing programs. **Strategic Initiatives – Trend Scenario *plus*:** • Legislated requirement for business travel plans and TDM programs at mid-sized and large workplaces. • Employee transit benefits and supportive measures (e.g. Emergency Ride Home) offered by many large and mid-sized workplaces. • Discounted transit fares offered by transit systems to committed transit commuters at registered workplaces. • Paid parking for auto commuters at many workplaces. • Adequate bike parking and shower/change facilities offered at most workplaces. • Removal of legislative barriers to vanpooling along with the promotion of vanpooling. • Telework (once a week or more) offered to one-half of commuters with appropriate jobs. • A dynamic, high-profile program provides recognition and rewards for leading employers. • Compressed work weeks and flexible working hours are prevalent. • Most universities and colleges offer universal transit passes (U-PASS).	All larger workplaces offer commuter options programs. Jobs routinely include free transit passes and paid parking. Carpooling is the norm for auto commuters, except in unusual circumstances. **Strategic Initiatives – Incremental Scenario *plus*:** • Provincial and federal governments treat employer-provided transit benefits as tax-exempt. • Free transit passes offered to employees at virtually all workplaces. • Emergency Ride Home programs are offered at most mid-sized and large workplaces. • Free transit passes offered to secondary school students. • Tax-exempt benefits offered to active commuters at most workplaces (e.g. for bike purchase). • Provincial and federal governments treat free or subsidized employee parking as a taxable benefit. • Paid parking for auto commuters at most workplaces. • Requirement for adequate bike parking, showers and change rooms at workplaces over a minimum size. • Vanpool subsidy programs including extra seat subsidies. • Telework (twice a week or more) offered to a majority of commuters with appropriate job types. • Union contracts no longer include provisions for deeply discounted or free employee parking.

Table 15 : Commuter Travel

OPTIONS FOR ACTION: TDM		
School Travel		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Some primary schools have "active and safe routes to school" programs, and/or activities like "walking school buses", but cycling is relatively rare due to safety concerns. Very few initiatives exist for middle or secondary schools. Secondary schools typically offer parking to students who wish to bring automobiles to school. Many schools experience traffic congestion and safety-related operational issues at school starting and closing times.	All schools actively encourage and support sustainable travel options for students and teachers. Walking and cycling to school are actively supported for all students not served by school buses. Student parking is provided only for those facing exceptional circumstances. **Strategic Initiatives – Trend Scenario *plus*:** • "Travel plans" required for primary, middle and secondary schools. • Active and safe routes to school programs in place at all primary schools. • Ride-matching in place at all schools. • New schools are located and designed to support walking and cycling. • Elementary school curricula address sustainable transportation issues. • All elementary students receive bicycle skills training at school. • Curbs on drop-off and parking areas, discouraging parents from dropping off students. • Strict limits on student parking at high schools.	Students at all schools travel as little as possible. Telecommunications enable some students to learn at home, at least part-time. Parking supply at schools is minimized and either redeveloped or greened. **Strategic Initiatives – Incremental Scenario *plus*:** • School operation rationalization to minimize student travel demands. • Greening or redevelopment plans for school parking lots. • Remote (virtual) classes offered for secondary school students in low-density communities. • Full-cost pricing of parking when available.

Table 16 : School Travel

OPTIONS FOR ACTION: TDM		
Promotion and Outreach		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Most residents perceive sustainable travel options as a "distant second choice" to automobile use in terms of prestige, comfort and convenience. Annual commuting events (Clean Air Commute, Commuter Challenge) raise awareness and encourage the trial of sustainable options by a small minority of residents. A variety of transit systems and interest groups communicate with the public about sustainable options, but without coordination or sustained effect. Individualized marketing does not occur.	As a result of increased promotion and outreach, residents see sustainable travel options in a more favourable light. Marketing of transit, ride-sharing, active transportation and car-sharing services is more evident and effective. Home-based individualized marketing programs target residents of some communities. Regular region-wide special events encourage new users to try transit walking, cycling, ride-sharing and telework. **Strategic Initiatives – Trend Scenario *plus*:** • Central support (financial and technical) for individualized marketing programs in communities. • Expanded multi-modal special events with participant incentives and rewards. • Many new housing developments offer free transit passes for an initial period (one year or more). • Many condominium developments offer car-sharing, bike lockers and transit passes.	Effective branding and positioning of sustainable travel options have brought them closer to being the social norm for many trips. Information on all travel options is readily available by a variety of means. Residents are regularly contacted to explore their interest in sustainable travel options. **Strategic Initiatives – Incremental Scenario *plus*:** • Coordinated branding and messaging campaigns for transit, active transportation, ride-sharing and telework. • A coordinated and systematic program of home-based individualized marketing contacts every household in the region at least once every five years. • Car-sharing programs are available in all parts of the region.

Table 17 : Promotion and Outreach

OPTIONS FOR ACTION: TDM		
Traveller Information		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Online transit trip planners offered by some systems. Real-time transit arrival information at some transit stops offered for very select services. Information signs on major highways only offer limited information.	Advice on planning a transit trip is much more accessible, as is real-time information on individual transit routes. Traffic information is also more readily available to those on the road. **Strategic Initiatives – Trend Scenario *plus*:** • 511 system provides universal telephone access to multi-modal traveller information. • Online transit trip planners are accessible by a variety of electronic means. • Real-time transit information is available for most services from wireless devices. • Real-time traffic condition information and driver advice is available through wireless devices. • Next bus real-time information at key transit system interchanges and mobility hubs.	Online travel planning is fully integrated across modes and jurisdictions, making full use of real-time information. Road users receive the best possible automated advice on route selection based on current conditions. **Strategic Initiatives – Incremental Scenario *plus*:** • A single integrated travel planner is accessible by a variety of electronic means including wireless devices, and includes all regional transit services as well as cycling routes and air, rail, inter-city bus and real-time ride-matching services. • Real-time route optimization reflecting actual traffic conditions is offered through in-vehicle navigation systems. • Next bus real-time information at all transit stops.

Table 18 : Traveller Information

OPTIONS FOR ACTION: TDM		
Transportation Pricing		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Drivers pay no direct charges for their use of roads, other than the use of Highway 407. Car insurance premiums are annual rates that do not consider distances driven. Most parking is free outside of the highest-density areas. Transit fares are fixed by user type (senior, student, adult) and period (day, week, month).	Drivers face somewhat greater but still limited price signals for their use of public roads in the form of distance-based vehicle registration and insurance costs. Roads are not priced directly, other than new highway facilities. An integrated transit smart card system allows many variations in transit fares to reflect customer loyalty, frequency and trip lengths. **Strategic Initiatives – Trend Scenario *plus*:** • Annual vehicle registration fees reflect distance driven. • Distance-based vehicle insurance offered by some insurers. • Transit systems offer customized fares via smart cards.	Drivers pay directly for their use of major highways and much more for annual distance driven with a portion of fees directed into municipal revenues. **Strategic Initiatives – Incremental Scenario *plus*:** • Tolls on 400-series provincial highways and regional/municipal roads in the GTHA. Revenue streams are dedicated 100 per cent to sustainable transportation initiatives. Improved transit services are implemented before tolling starts. • Municipalities receive a portion of significantly increased distance-based registration fees for local vehicles. • Requirement for vehicle insurance premiums to be distance-based. • Provincial and federal governments treat all free or subsidized employee parking as a taxable benefit.

Table 19 : Transportation Pricing

OPTIONS FOR ACTION: TDM		
Parking Management		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
Most developments outside high-density areas are served by large surface parking lots that do not charge for parking. Zoning by-laws in these areas require new developments to supply parking at a level that exceeds typical daily (and in some cases annual) maximum demands. Developers who wish to provide less parking must demonstrate that there is no impact on neighbouring uses. The use of "shared-parking" strategies to reduce requirements for mixed-use developments is rare. In most areas, multi-unit residential parking is bundled with dwelling leases or purchase contracts.	Minimum parking requirements are reduced gradually and many new developments opt to provide less parking which assumes a portion of visitors do not arrive by SOV. More employers start to offer preferential parking for carpools and parking cash-out options. The market supports parking pricing in more Urban Growth Centres and other intensification areas. **Strategic Initiatives – Trend Scenario *plus*:** • Reduced zoned parking supply minimums. • Reductions in parking requirements based on transit accessibility, car sharing, bicycle facilities, etc. • Zoned parking supply maximums in transit-supportive areas. • Shared parking encouraged. • Paid parking in more Urban Growth Centres and other intensification areas. • Some residential parking unbundled from units. • Parking cash-out available at some workplaces. • Paid parking for auto commuters at many workplaces, and some major trip generators (e.g. large malls).	Many employers, retailers, institutions and other trip generators manage parking in terms of the extent (number of spaces), type (surface or structure), location (impact on access by transit or on foot) and price (based on the full cost of parking provision). Individuals are accustomed to paying for parking and receiving preferred treatment if they carpool. Zoning by-laws set maximum parking limits instead of minimums. Municipalities operate collective parking at mobility hubs and other compact, mixed-use areas. **Strategic Initiatives – Incremental Scenario *plus*:** • No zoned parking supply minimums. • Zoning maximums prevalent, encouraging shared parking. • Surface parking is strictly limited in Urban Growth Centres, and prohibited near rapid transit stations. • Collective parking operated by municipalities in Urban Growth Centres and other intensification areas with full-cost pricing. • Parking management plan required as part of site approval. • Residential parking required to be unbundled from units. • Parking cash-out available at all workplaces. Tax on commercial surface parking. • Paid parking for auto commuters at most workplaces and trip generators over a minimum size (e.g. shopping malls).

Table 20 : Parking Management

OPTIONS FOR ACTION: TDM		
Supportive Transportation Infrastructure and Land Use		
Trend Scenario	**Incremental Scenario**	**Bold Scenario**
	Strategic Initiatives – Trend Scenario ***plus*:** • Implement, monitor and enforce municipal intensification targets that are set out in the province's *Growth Plan*. • Enforce higher minimum residential and employment densities in Official Plans, secondary plans and zoning by-laws.	**Strategic Initiatives – Incremental Scenario** ***plus*:** • Least-cost land use planning, exploring TDM opportunities as an alternative to road expansions. • Low interest loans for transportation-efficient development. • Develop activity centres and mobility hubs. • Intensify corridors between activity centres.
HOV and/or transit lanes are provided on some arterial roads and a few segments of provincial expressways.	More extensive use of HOV/transit lanes in provincial highways. **Strategic Initiatives – Trend Scenario** ***plus*:** • Integrated network of HOV lanes on most provincial highways and more arterial roads. • All new arterial roads include HOV lanes. • Carpool parking lots at appropriate locations in all commuting corridors.	HOV/transit lanes are the norm on provincial highways and evolving urbanized areas. **Strategic Initiatives – Incremental Scenario** ***plus*:** • Many existing arterial roads have HOV lanes created by converting existing lanes. • Carpool lots exist at strategic locations aligned with the highway/arterial HOV network.
Queue jump lanes and transit priority traffic signal timing on a few municipal roads.	Expanded use of transit lanes, queue jumpers and transit priority traffic signal timing. **Strategic Initiatives – Trend Scenario** ***plus*:** • Inter-modal facilities at transit stations (bike parking, Park-and-Ride).	Transit lanes, queue jumpers and transit priority signal timing are present on virtually all major regional/municipal roads. **Strategic Initiatives – Incremental Scenario** ***plus*:** • Many existing arterial roads have HOV lanes created by converting existing lanes. • Public vanpool program with vehicles provided by Metrolinx where base conditions are met.

Table 21 : Supportive Transportation Infrastructure and Land Use

4.2 Evaluating TDM Options

How will these future scenarios be evaluated and transformed into a TDM strategy within the RTP? Based on consultation and further study, each scenario will be refined and expanded based on the strategic initiatives presented above. The benefits of each will be assessed based on the three lenses of the RTP: people, the environment and the economy. The options will be further refined and assessed taking into account the criteria listed in the table that follows.

Once the benefits of the strategic initiatives have been evaluated with respect to the three lenses of the RTP, a second evaluation will summarize the initiatives with respect to costs and potential risks. These risks can be categorized into six areas:

- **Public and political acceptance** – Whether there is the political will to implement the strategy and if the broad public will accept the measures (two closely related issues).
- **Resource and cost requirements** – The financial investment required and potential risk for cost overrun or slower-than-anticipated cost recovery.
- **Regulatory or legislative barriers** – Whether there are any laws or regulations that act as obstacles to a specific initiative.
- **Technical feasibility** – The risk in implementing the initiative from a purely technical point of view.
- **Effectiveness** – The degree to which the strategy is likely to be successful in providing the projected benefits.
- **Implementation risk** – Any factor affecting the timely ability to implement the strategy, possibly related to delays with concurrent infrastructure projects or staffing or other resource problems.

The risk assessment will aid in choosing the package of initiatives that will form the core of the TDM strategy. An example of this type of analysis would be for comprehensive road-pricing, presented here as part of a bold scenario, that takes into account the substantial levels of risk (political, legislative, technical and effectiveness) and benefit (lower congestion, travel-time savings, environmental benefits, ability to improve other modes through reinvested revenues). Road pricing experiences in other urban regions will be extremely relevant in the assessment of benefits and risks.

Readers of this Green Paper are urged to review and comment on the presentation of alternative future scenarios and strategic initiatives in the preceding section. Readers are also encouraged to comment on the overall concepts and ideas presented in this paper and to provide input on their preferred future scenarios and how to bring them about.

Evaluation criteria
People
To what extent will this initiative: • Improve transportation choices for cross-regional trips (both single-mode and multi-modal)? • Improve access to important services and opportunities? • Reduce congestion and time spent travelling? • Reduce travel costs for individuals and families? • Improve the health benefits of personal transportation by motivating individuals to live healthier lifestyles? • Improve the safety of travel choices? • Build awareness of sustainable transportation choices and benefits?
The Environment
To what extent will this initiative: • Motivate modal shift from SOVs to walking, cycling, transit and ride-sharing? • Reduce the volume of trips, especially during peak periods? • Reduce energy consumption through a shift to energy-efficient modes and a reduction in travel? • Reduce the emission of greenhouse gases from transportation? • Reduce the emission of other air, water and land pollutants? • Reduce transportation impacts on individuals, families and neighbourhoods?
The Economy
To what extent will this initiative: • Extract greater value from existing transportation infrastructure by supporting efficient, reliable operation in congested transportation corridors? • Enhance the return on new investments in transportation infrastructure and services? • Reduce transportation capital and operating costs for governments? • Generate revenue for investments in improved transportation services? • Make individual businesses and communities more competitive? • Reduce costs for business? • Improve the punctuality, productivity, morale and health of commuters? • Directly generate economic activity? • Directly encourage technological innovation? • Reduce congestion and delays?

Table 22 : Evaluation criteria

4.3 Quick Wins

A long-range transportation plan is likely to focus on projects that may take several years or even decades to implement. However, it is important to build momentum and stakeholder buy-in for the plan as early as possible. For this reason, plans often include a short-term program of Quick Win projects. Desirable characteristics of Quick Win projects include:

- Implementation time of two years or less;
- Visible, tangible benefits of regional significance (e.g. cross-boundary);
- Low implementation risks; and
- Moderate costs.

Metrolinx has recently committed to a number of Quick Win projects for the GTHA, including two that represent excellent elements of an integrated regional TDM strategy:

- **Web-based trip planner ($1.25 million)** – A seamless scheduling and mapping system for inter-regional transit customers, with real-time travel delay and incident advisories. The system would be developed in collaboration with transit service providers in the GTHA.
- **Personal carbon footprint calculator ($250,000)** – A web-based system designed to increase awareness of the impacts of personal travel and employment/home location decisions on air quality, climate change, bio-diversity and other environmental indicators.

To accompany these approved projects, several other Quick Wins may also be considered:

- **Business travel plans** – Demonstration of leadership by example through the development of business travel plans for major municipal and provincial government offices throughout the GTHA.
- **Vanpooling** – Removal of legislative barriers to vanpooling and undertaking of a moderate-scale vanpooling pilot project in cooperation with a local transit system or third-party commercial service provider.
- **School travel planning** – Pilot project of school travel plans to accompany active and safe routes to school efforts, perhaps with one or more plans in the City of Toronto and each regional municipality.
- **Individualized marketing** – Pilot project to demonstrate the viability and effectiveness of individualized marketing in the GTHA, perhaps with one project in the City of Toronto and each regional municipality.
- **Increased cross-promotions** – Discounts and incentives for transit users, including combining them with car-sharing services.

Appendix A: Potential Initiatives

	Initiative
Government Leadership	
GL1	• All municipalities have TDM strategies that are coordinated but reflect unique local needs
GL2	• TDM initiatives routinely accompany major transportation infrastructure and service improvements
GL3	• TDM requirements for development applications are coordinated and consistent among municipalities
GL4	• Most municipal, provincial and federal government offices have implemented effective multi-modal commuter options programs for their employees, with appropriate incentives and required facility improvements
GL5	• All government staff receive free transit passes as a tax-exempt benefit and pay for parking
GL6	• Part-time telework for regular office staff is expected and all government agencies offer full-time telework to eligible employees
GL7	• All government offices offer adequate and secure bicycle parking, showers and change facilities for active commuters
Commuter Travel	
CT1	• Legislated requirement for business travel plans and TDM programs at mid-sized and large workplaces
CT2	• Employee transit benefits and supportive measures (e.g. Emergency Ride Home) offered by many large and mid-sized workplaces
CT3	• Discounted transit fares offered by transit systems to committed transit commuters at registered workplaces
CT4	• Paid parking for auto commuters at many workplaces
CT5	• Adequate bike parking and shower/change facilities offered at most workplaces
CT6	• Removal of legislative barriers to vanpooling along with the promotion of vanpooling
CT7	• Telework (once a week or more) offered to half of commuters with appropriate jobs
CT8	• A dynamic, high-profile program provides recognition and rewards for leading employers
CT9	• Compressed work weeks and flexible working hours are prevalent
CT10	• Most universities and colleges offer universal transit passes (U-PASS)
CT11	• Provincial & federal governments treat employer-provided transit benefits as tax-exempt
CT12	• Free transit passes offered to employees at virtually all workplaces
CT13	• Emergency Ride Home programs are offered at most mid-sized and large workplaces
CT14	• Free transit passes offered to secondary school students
CT15	• Tax-exempt benefits offered to active commuters at most workplaces (e.g. for bike purchase)

		Initiative
CT16	•	Provincial and federal governments treat free or subsidized employee parking as a taxable benefit
CT17	•	Paid parking for auto commuters at most workplaces
CT18	•	Requirement for adequate bike parking, showers and change rooms at workplaces over a minimum size
CT19	•	Vanpool subsidy programs including extra seat subsidies
CT20	•	Telework (twice a week or more) offered to a majority of commuters with appropriate job types
CT21	•	Union contracts no longer include provisions for deeply discounted or free employee parking
School Travel		
ST1	•	"Travel plans" required for primary, middle and secondary schools.
ST2	•	Active and safe routes to school programs in place at all primary schools
ST3	•	Ride-matching in place at all schools
ST4	•	New schools are located and designed to support walking and cycling
ST5	•	Elementary school curricula address sustainable transportation issues
ST6	•	All elementary students receive cycling skills training at school
ST7	•	Curbs on drop-off and parking areas, discouraging parents from dropping off students
ST8	•	Strict limits on student parking at high schools
ST9	•	School operation rationalization to minimize student travel demands
ST10	•	Greening or redevelopment plans for school parking lots
ST11	•	Remote (virtual) classes offered for secondary school students in low-density communities
ST12	•	Full-cost pricing of parking when available
Promotions and Outreach		
PO1	•	Central support (financial and technical) for individualized marketing programs in communities
PO2	•	Expanded multi-modal special events with participant incentives and rewards
PO3	•	Many new housing developments offer free transit passes for an initial period (one year or more)
PO4	•	Many condominium developments offer car-sharing, bike lockers and transit passes
PO5	•	Coordinated branding and messaging campaigns for transit, active transportation, ride-sharing and telework
PO6	•	A coordinated and systematic program of home-based individualized marketing contacts every household in the region at least once every five years

	Initiative
Traveller Information	
TI1	• 511 system provides universal telephone access to multi-modal traveller information
TI2	• Online transit trip planners are accessible by a variety of electronic means
TI3	• Real-time transit information is available for most services from wireless devices
TI4	• Real-time traffic condition information and driver advice is available through wireless devices
TI5	• Next bus real-time information
TI6	• A single, integrated travel planner is accessible by a variety of electronic means including wireless devices and includes all regional transit services as well as cycling routes and air, rail, intercity bus and real-time ride-matching services
TI7	• Real-time route optimization reflecting actual traffic conditions is offered through in-vehicle navigation systems
TI8	• Next bus real-time information
Transportation Pricing	
TP1	• Annual vehicle registration fees reflect distance driven
TP2	• Distance-based vehicle insurance offered by some insurers
TP3	• Transit systems offer customized fares via smart cards
TP4	• Tolls on 400-series provincial highways and regional/municipal roads in the GTHA. Revenue streams are used by Metrolinx to enhance sustainable transportation services and facilities
TP5	• Municipalities receive a portion of significantly increased distance-based registration fees for local vehicles
TP6	• Requirement for vehicle insurance premiums to be distance-based
TP7	• Provincial and federal governments treat all free or subsidized employee parking as a taxable benefit
Parking Management	
PM1	• Reduced zoned parking supply minimums
PM2	• Reductions in parking requirements based on transit accessibility, car-sharing, bicycle facilities, etc.
PM3	• Zoned parking supply maximums in transit-supportive areas
PM4	• Shared parking encouraged
PM5	• Paid parking in more Urban Growth Centres
PM6	• Some residential parking unbundled from units
PM7	• Parking cash-out available at some workplaces
PM8	• Paid parking for auto commuters at many workplaces and some major trip generators (e.g. large malls)

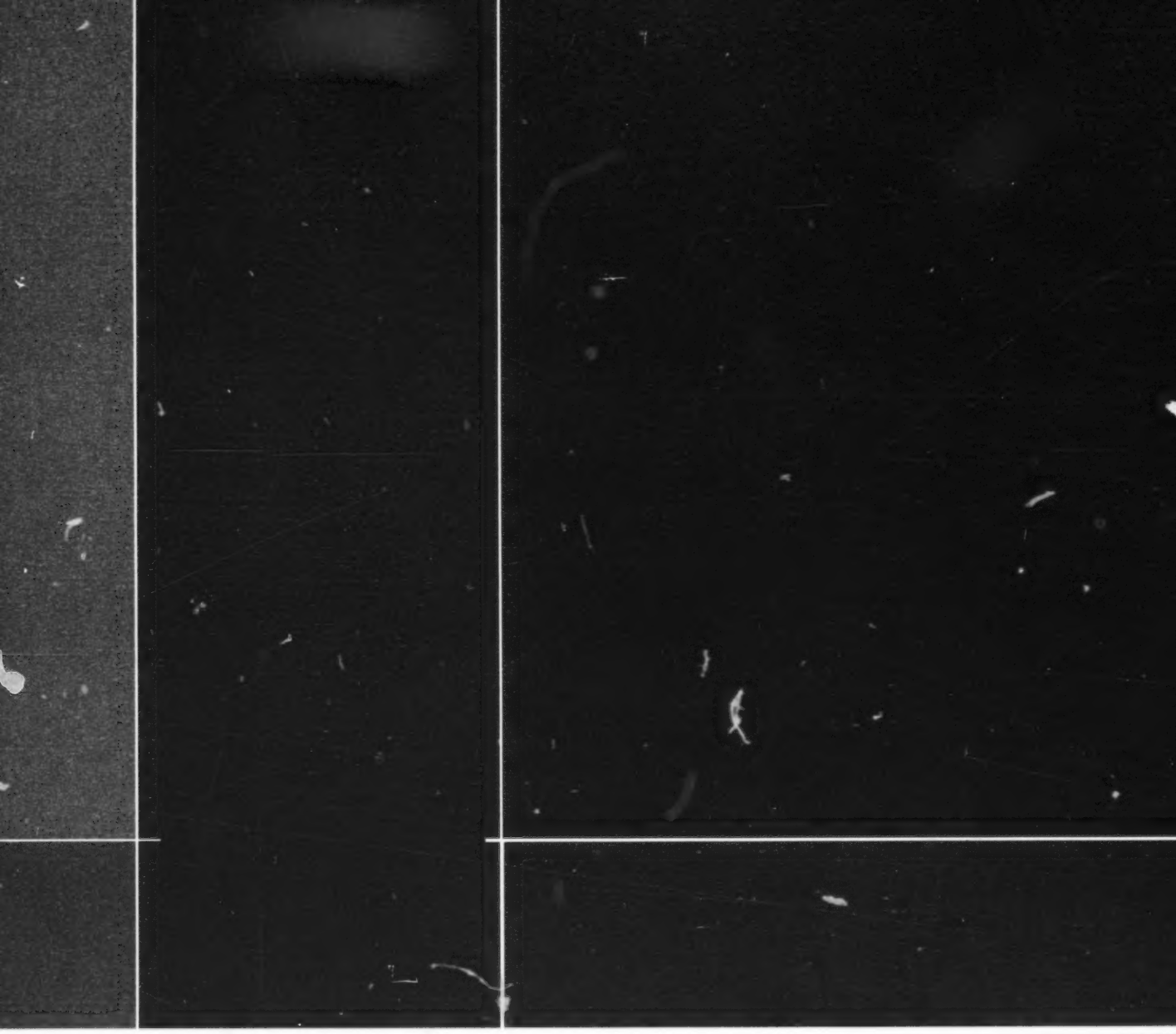
	Initiative
PM9	• No zoned parking supply minimums
PM10	• Zoning maximums prevalent, encouraging shared parking
PM11	• Surface parking is strictly limited in Urban Growth Centres and prohibited near rapid transit stations
PM12	• Collective parking operated by municipalities in Urban Growth Centres with full-cost pricing
PM13	• Parking management plan required as part of site approval
PM14	• Residential parking required to be unbundled from units
PM15	• Parking cash-out available at all workplaces
PM16	• Tax on commercial surface parking
PM17	• Paid parking for auto commuters at most workplaces and trip generators over a minimum size (e.g. shopping malls)
Supportive Transportation and Land Use	
LU1	• Enforce Urban Growth boundary
LU2	• Enforce higher minimum residential densities
LU3	• Integrated network of HOV lanes on most provincial highways and more arterial roads
LU4	• All new arterial roads include HOV lanes
LU5	• Carpool parking lots at appropriate locations in all commuting corridors
LU6	• Intermodal facilities at transit stations (bike parking, Park-and-Ride)
LU7	• Least-cost land use planning
LU8	• Low-interest loans for transportation efficient development
LU9	• Develop activity centres or mobility hubs with mixed-use residential, retail and community uses
LU10	• Intensify corridors between activity centres
LU11	• Many existing arterial roads have HOV lanes created by converting existing lanes
LU12	• Carpool lots exist at strategic locations aligned with the highway/arterial HOV network
LU13	• Many existing arterial roads have HOV lanes created by converting existing lanes
LU14	• Public vanpool program with vehicles provided by Metrolinx where base conditions are met

Table 23 : Potential Initiatives

Appendix B: Photo Credits

Picture 1	Parking space reserved for Zipcar	Luis Villa del Campo, under the terms of an Attribution Creative Commons licence.
Picture 2	Vanpool program	Commuterclub Vanpool (www.commuterclub.com)
Picture 3	Surface parking lot	Alejandro Forero Cuervo, under the terms of an Attribution Creative Commons licence.
Picture 4	Presto electronic payment	http://www.prestocard.ca/
Picture 5	*Smart Commute* 404-7	*Smart Commute*

Table 24 : Photo Credits



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